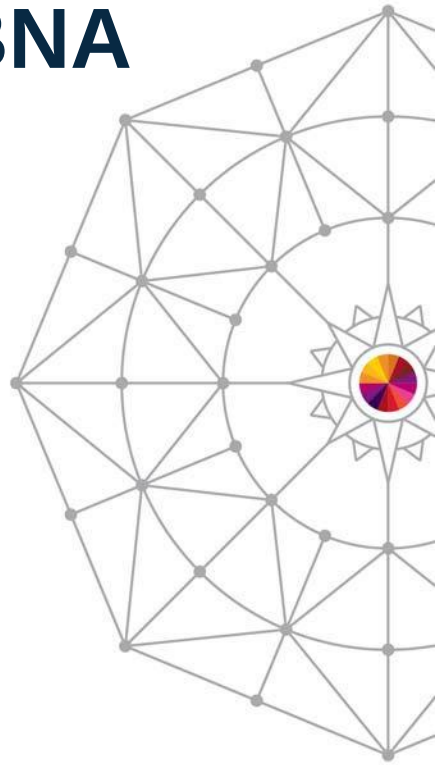
Batch Workload Analysis using zBNA User Experience

Meral Temel
System Architect / z/OS Team Leader
ISBANK



#SHAREorg

SHARE is an independent volunteer-run information technology association that provides education, professional networking and industry influence.

Batch Workload Analysis Using zBNA User Experience

Agenda

- Who is İşBank ?
- Mainframe Configuration
- What is zBNA ?
- Why Batch ?
- Batch Bottlenecks & Analysis Methods & Problems-Experienced & Solutions - Implemented
- zBNA Panels & Cases That zBNA Helps

Who Is İŞBANK ?

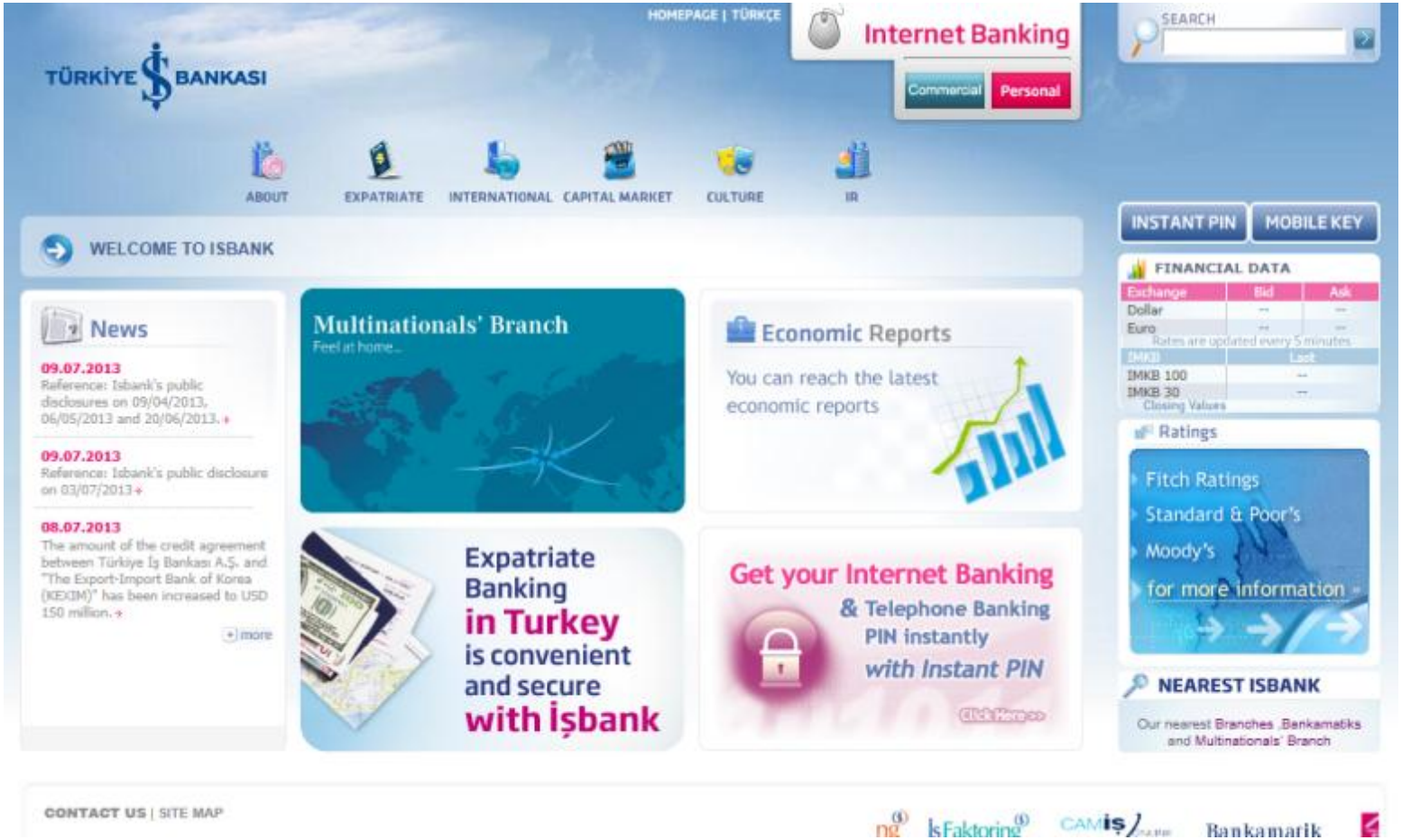
- The Biggest Bank Of Turkey
- 5521 ATMs
- 1296 Branches In Turkey, 20 Branches Outside Turkey
- Has The Highest Profit According To All Bank Announcements 2013
- Member Of SHARE Inc.

Who Is İŞBANK ?

BRANCHES

Who Is İŞBANK ?

INTERNET BANKING



Who Is İŞBANK ?

ATM

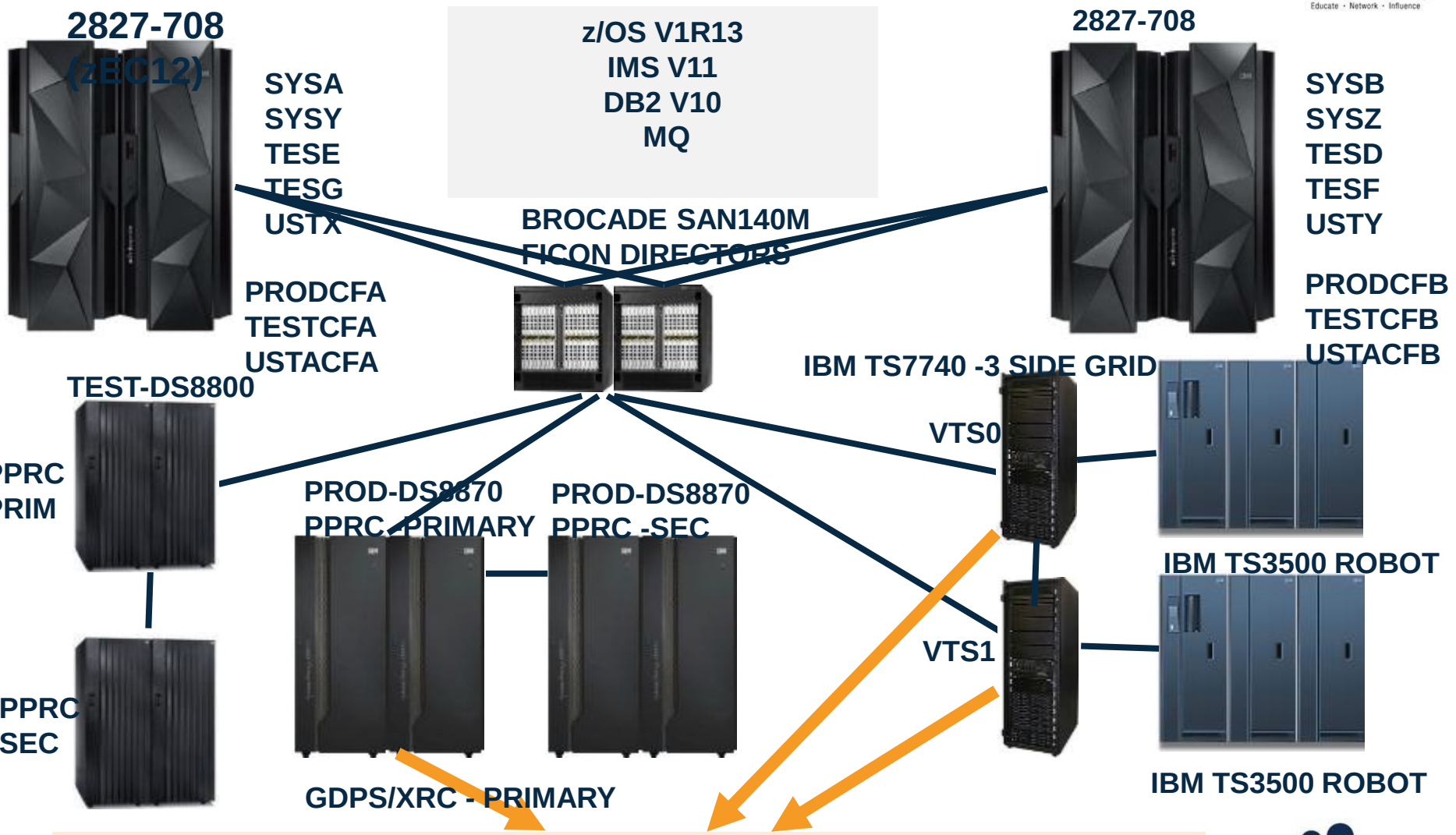
İŞCEP
Mobile Phone Application

İŞBANK IPAD FINANCE CENTER
Application

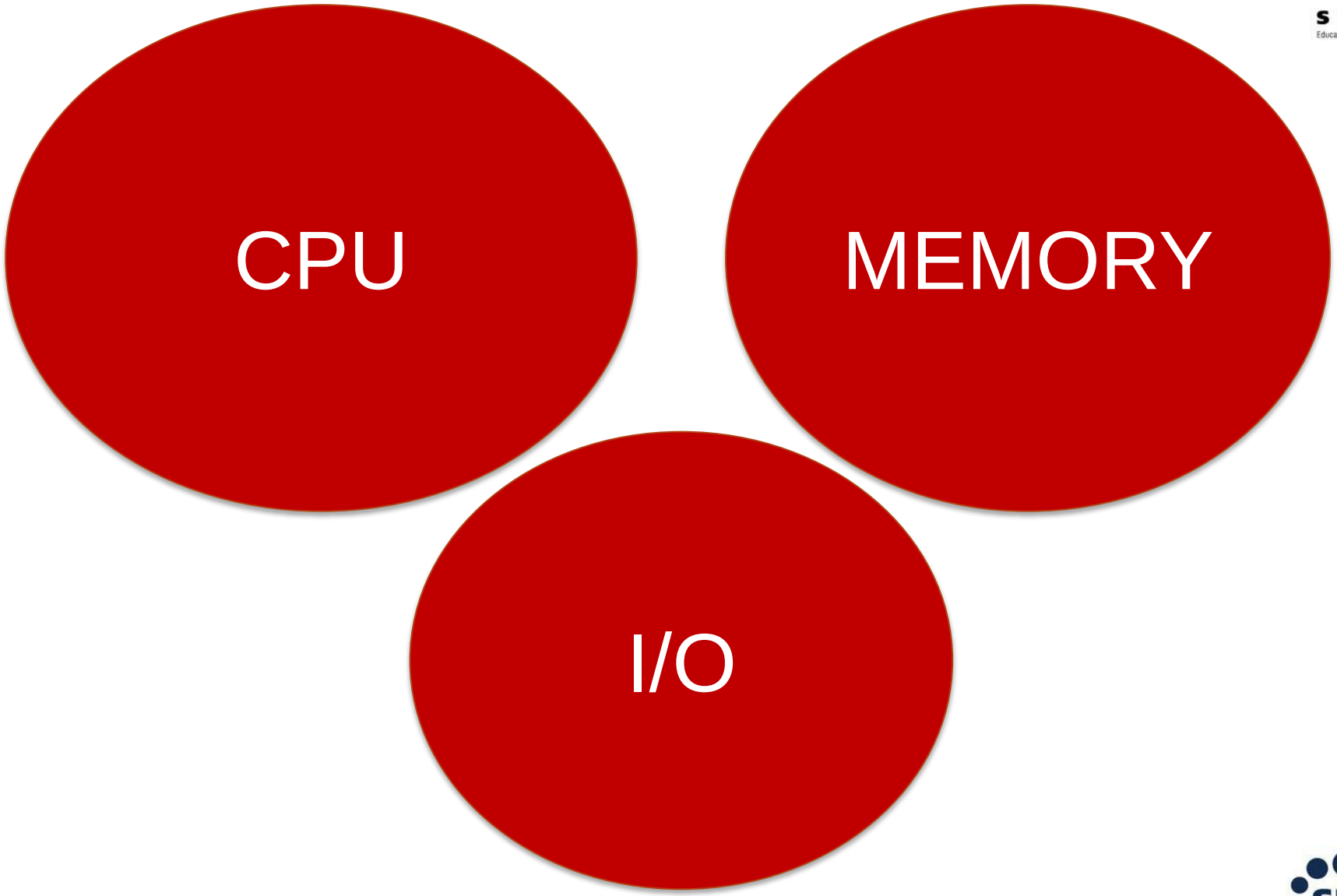
Who Is İŞBANK ?

Credit Cards

İşbank – Mainframe Configuration



PERFORMANCE & RESOURCES



BATCH WORKLOAD

BATCH PERFORMANCE IS IMPORTANT, BECAUSE…

- **If Batch Window Does not finish on time, it will go into onlinetime window**
  Batch job mostly …
  - **Does Bulk I/O**
  - **Does Bulk DB Access**
  - **Does Bulk Reads much worse bulk writes**
  - **Can cause higher CF lock requests**
  - **Can use aggressive CPU resource**
  - **Can use internal database services much aggresivelly**
- **All Of These Stresses System Resources , That's why we don't want batch to run within onlinetime period ...**
- **If 4 Hr MSU peak values are during onlinetime , adding batch cpu to this workload have the possibility to cause you pay more…**
- **If you are using Softcapping, bad batch performance can cause you start onlinetime with your systems SOFTCAPPED….**
- **Big data can cause much higher increase ratio on batch workload then OLTP**
- **Some OLTP processes depends on some batch processes to be finished. You may not start new day before finishing some batch processess.**

So batch window MUST FINISH on time before OnlinePeriod Starts…..

BATCH PERFORMANCE IS IMPORTANT, BECAUSE…

- **Batch Job That Has cpu delay is also owning a lock , it can cause critical OLTP workload to suffer from these locks…**

- **Not correctly planned batch window can have the possibility to be reason of highest 4 hr MSU and reason of paying more money….**

Batch ElapseTime can increase because…. *few of them

- CPU Delay
  Increase in amount of workload that job processes
  Increase in cpu usage of system during job running time because of other jobs
  (amount of other jobs, cpu usage of other jobs)

- I/O delay
  I/O Performance Problem of specific dataset/volume (Lack of buffers…incorrect blocksize….)
  I/O Performance Problem of general DASD (unbalanced LCUs ,microcode,misconfigured cache size)
  I/O Performance Problem because of XRC/PPRC effect
  I/O Performance Problem because of Lack Of Channel Paths, Host Adapters

- ENQ Problems (Waiting For Same Datasets)

- Database Lock Contentions

- Purely Performed System Services
  Catalog performance, paging, not enough CF paths, CF resources……
- Lack Of Memory (Job Related, System Related)

- Misconfigured System – WLM Policy, SORT configuration

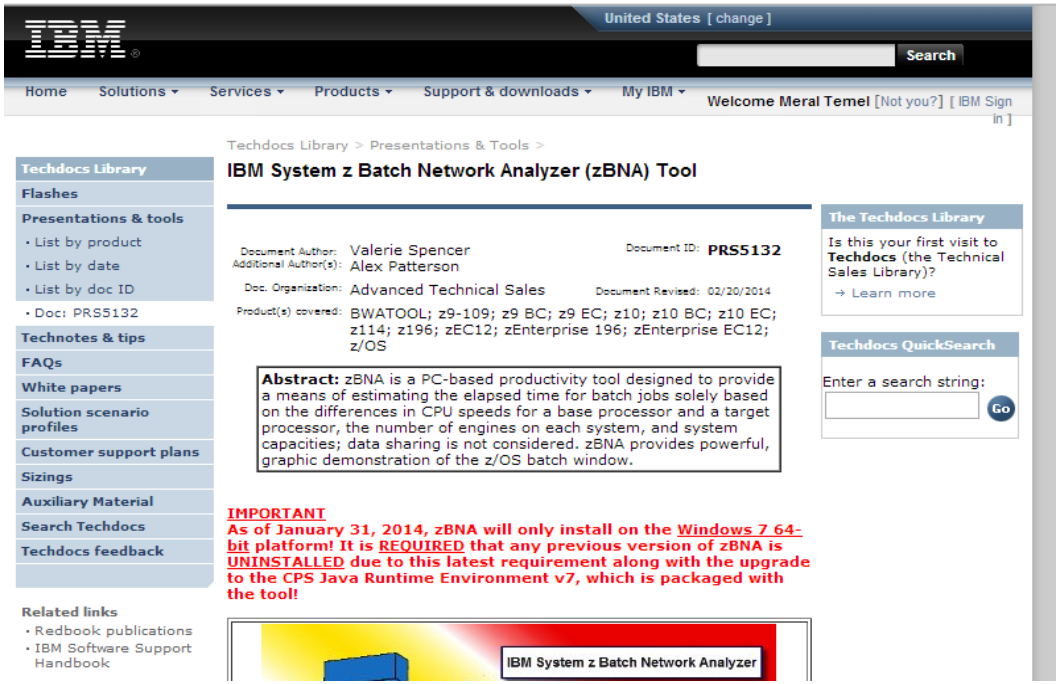
- Lack Of Parallelism - WLM managed Initiator- Waiting for initiator , Lack Of Static Initiators

- Uncontrolled workload

What is zBNA ?

- FREE!!!!!! Tool To Analyze Batch Window
- Available On Techdocs

http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS5132

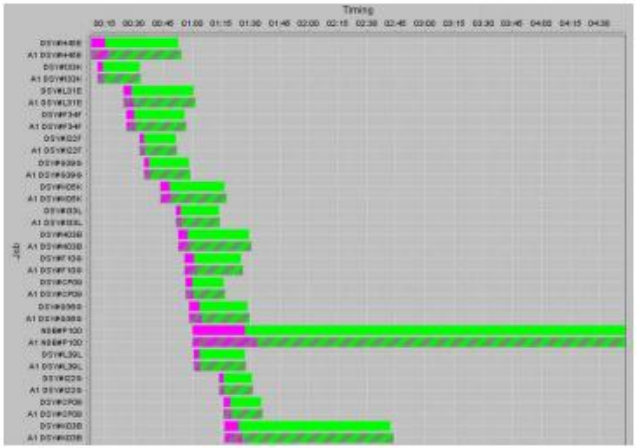


15671: System z Batch Network Analyzer (zBNA) Tool Hands-on Lab – Thursday 4:15 PM
15706: System z Batch Network Analyzer (zBNA) Tool – Because Batch is Back!

zBNA Version

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, providing graphical and text reports
  - Includes Gantt charts and support for Alternate Processors (what if scenarios)
  - zBNA V1.3
    - Support for SMF 42 records to understand the “Life of a Data Set”
  - zBNA V1.4.2
    - Support for SMF 14/15 records to understand zEDC compression candidates



NEW

zBNA Version – Recent Updates By John Burg

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

Process Data So Fast!

- 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 Version – Recent Updates By John Burg

zBNA – Some Recent Updates include:

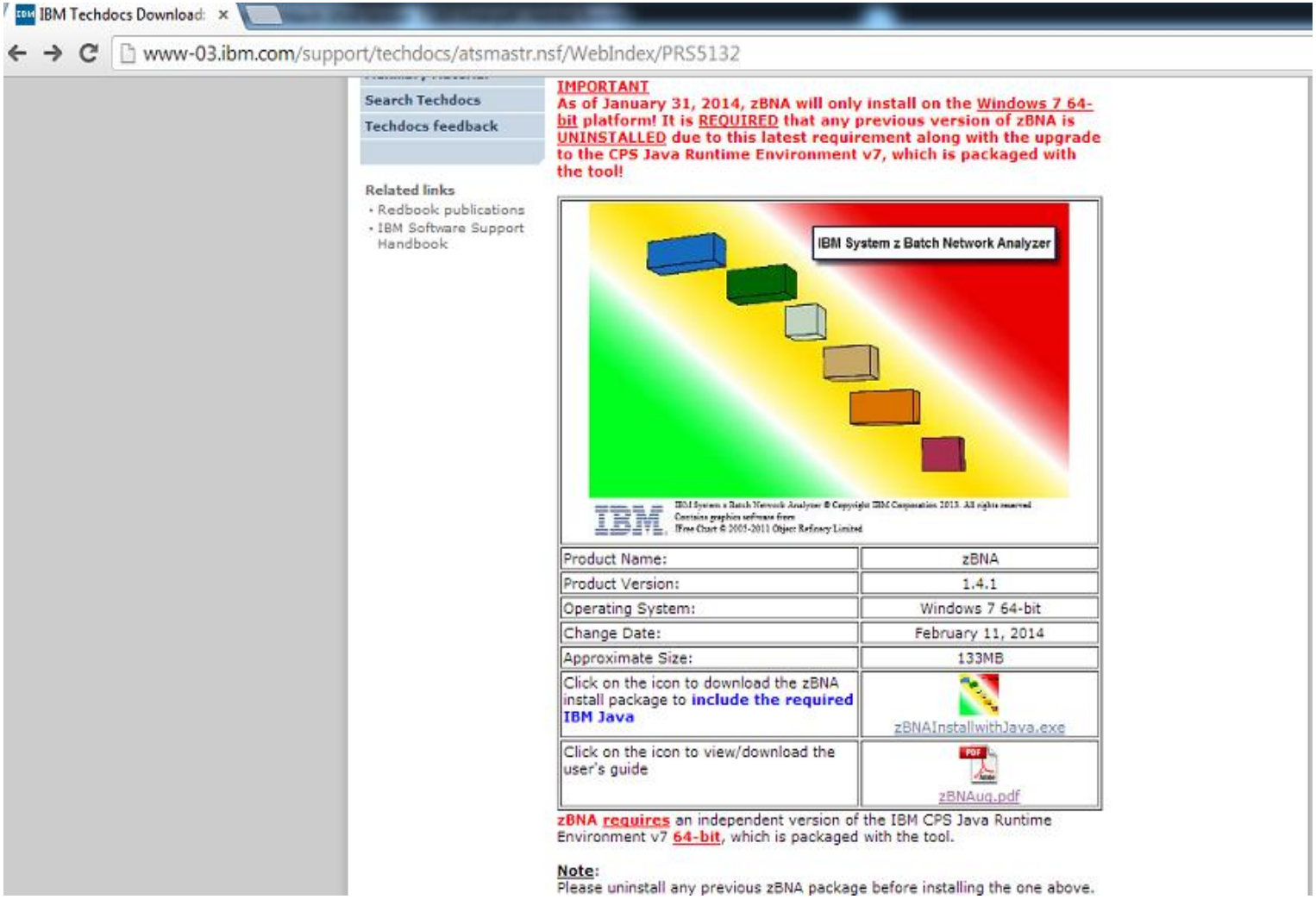
See C:\CPSTOOLS\zBNA "zBNAnews.pdf" for a complete description

- 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.

How To Use zBNA ?

❑ Download From Techdocs Website



zBNA AMAZING TOOL !

- AMAZING GRAPHS!
- DOES SMF 7X, SMF42,SMF14,15 analysis SOOO FAST!
- USE IT EVERYDAY, IN EVERY BATCH RELATED ANALYSIS-Even for one batch job.
- THE ONLY THING TO PREPARE IS ONE JCL TO CREATE TWO INPUT FILES!
- VERY USER FRIENDLY!
- AMAZING PANEL FUNCTIONS!
- 'LIFE OF DATASET' IS BY ITS OWN CAUSES THIS TOOL WORTH BEING USED DAILY BASIS
- BATCH ELAPSETIME DISTRIBUTION GRAPH , BY ITS OWN, CAUSE THIS TOOL WORTH BEING USED DAILY BASIS

THANKS TO IBM ATS TEAM!

Where & When To Use zBNA ? & Why ?

Why use zBNA?

- Perform "what if" analysis and estimate CPU upgrade effect on batch window
- Identify job time sequences based on a graphical view
- Filter jobs by attributes like CPU time / intensity, job class, service class, etc.
- Review the resource consumption of all the batch jobs
- Drill down to the individual steps to see the resource usage
- Identify candidate jobs for running on different processors
- Identify jobs with speed of engine concerns (top tasks %)
- Identify by job which datasets are used and the datasets performance info
- For any dataset identify every job in the time window using the data set
- Identify top zEDC compression candidates and understand the zEDC card capacity required

Where & When To Use zBNA ? & Why ?

Real Case Samples…

- Daily Basis Batch Window Tracking – Quick and Great Graph
- Performance Analysis of even one job – ElapseTime distribution
- Upgrade Plans CPU model – How Will the upgrade effect my batch window ?
- LPAR Configuration Change Planning – How will LPAR Change effect my batch window ? (In the backend zPCR algorithms are being used…)
- Want to do changes in one dataset , which jobs will be effected – Simple way of finding LIFE of a dataset
- Precreated pdf files, download to PC , when needed use them … ?
- zEDC Capacity Planning Study .- Top Candidates & Card Capacity Planning

How To Use zBNA ?

- Download CPEXTRACT From Techdocs Website

If you are using zPCR ,you have already CPSTOOLS
*Check the site for latest updates and version

- Download zBNA (PC based tool – like zPCR)
- Create 2 EDF files : One for SMF 7X and one for 14,15,30,42
- Load EDF Files to zBNA
- Start working on…..
- Great Data & Nice Charts!.... Sooo FAST!!!

Hints

- Depending on your environment and SMF record amount , use small intervals

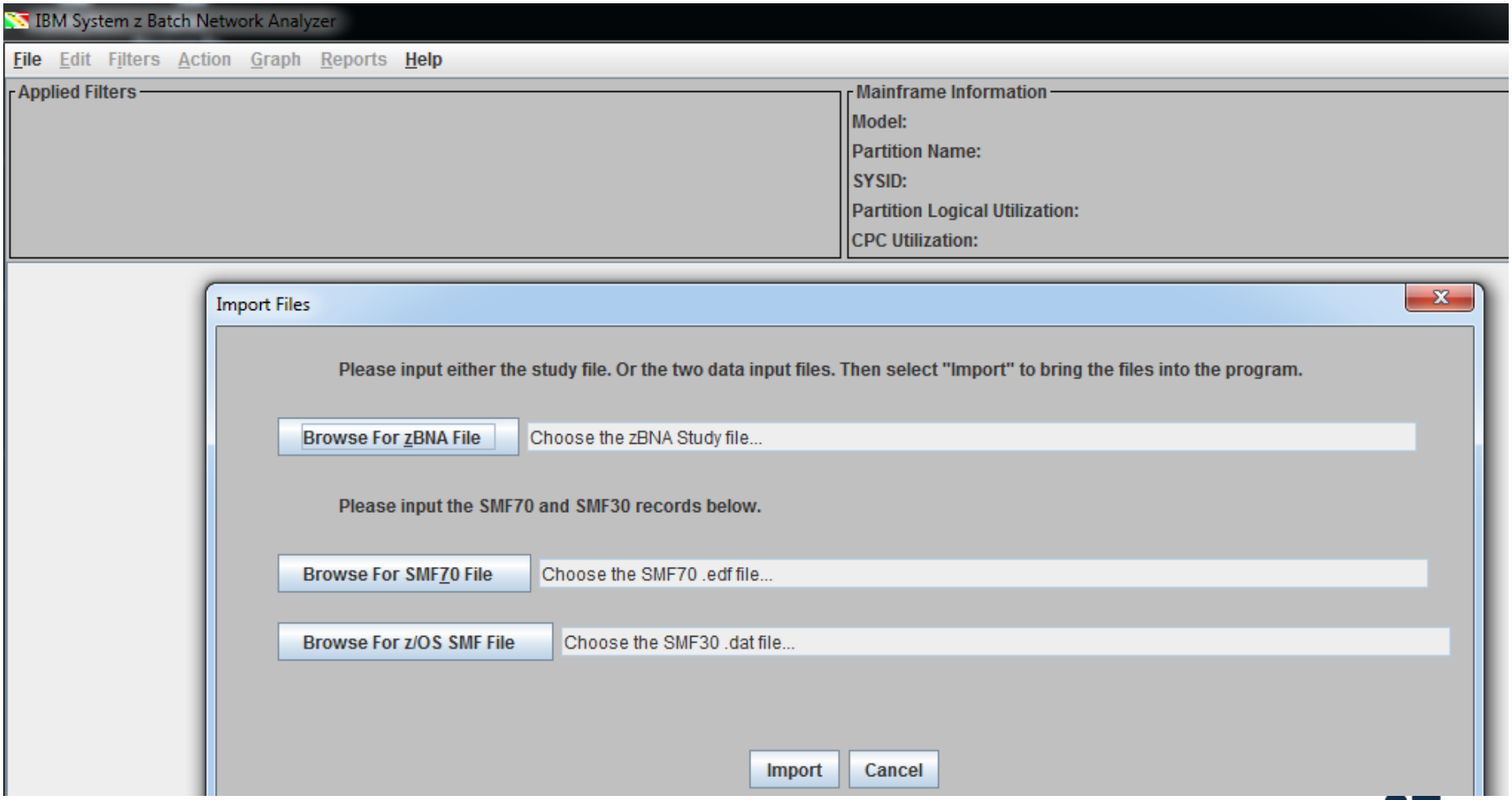
```
DSLIST - Data Sets Matching IS93081.*ALK                    Data Set - Browsed
Command - Enter Ü/Ü to select action                        Tracks %Used   XT
-------------------------------------------------------------------------------
_         IS93081.SMF4ALK                                     5145    99     7
          IS93081.ZBNA4ALK                                      30    66     1
****************************** End of Data Set list ****************************
```

- Don’t do separate processing – Without SMF7X , you can not process edf for 14,15,30.42

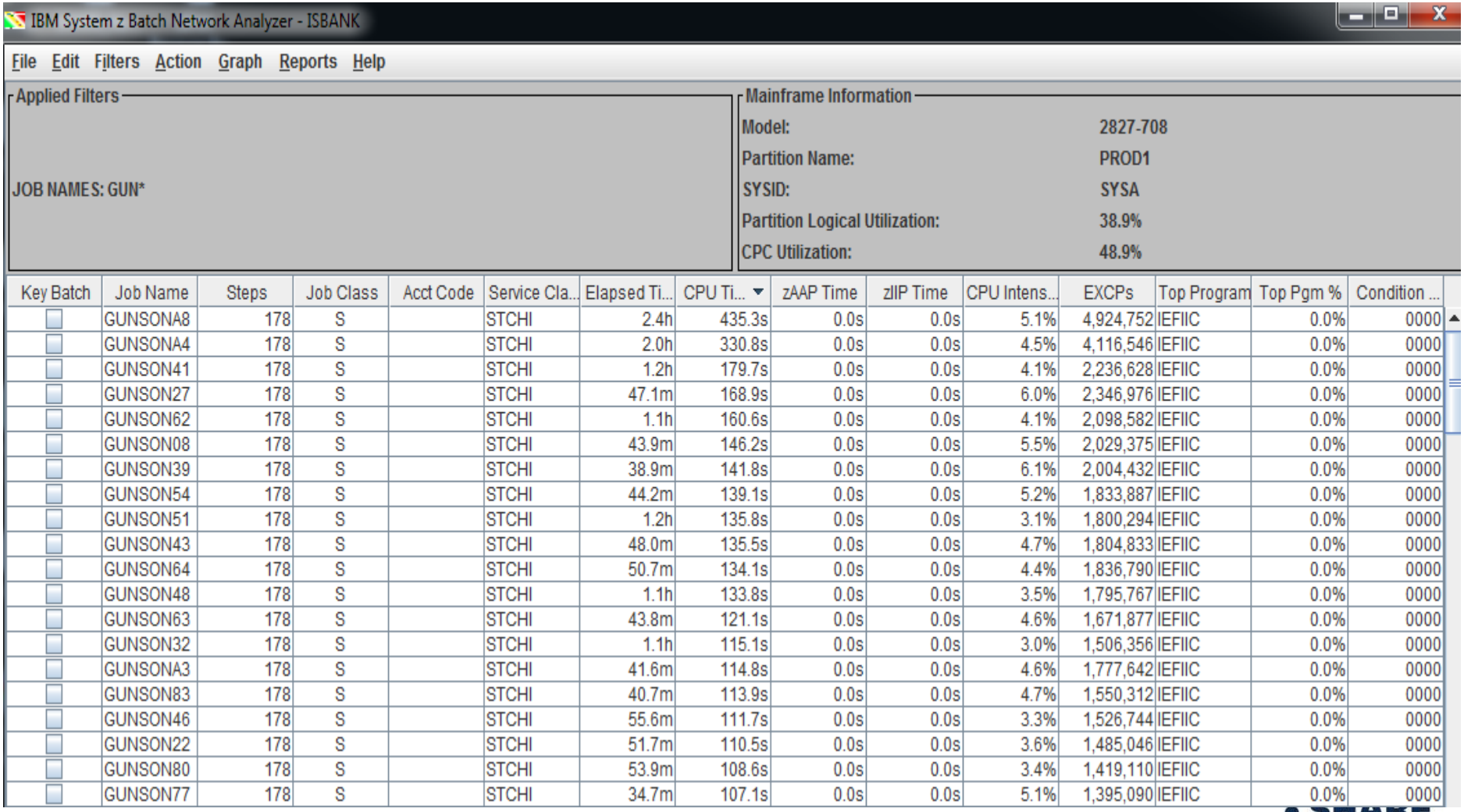
CPEXTRACT RC 4 occurs but Data001 DD (edf file for smf other than 7X) will be empty

```
<----------- SYSIN001 DATASET PROCESSED
CP3KEXT: NO BCUMAP PROCESSING REQUESTED
-----PROCESSING RMF DATA FOR WORKLOAD IN GOAL MODE----->
CP3KGOAL: NO TYPE 72 SUBTYPE 3 FOUND IN SPECIFIED INTERVAL
CP3KUTIL SYSID: SYSA MVS:           RMF: V0R0M
     TYPE 014     496496 RECORDS FROM: 02/18/14 00:01 - 02/19/14 00:01
     TYPE 015     308587 RECORDS FROM: 02/18/14 00:01 - 02/19/14 00:01
     TYPE 030 02    4686 RECORDS FROM: 02/18/14 00:01 - 02/19/14 00:01
     TYPE 030 03   41295 RECORDS FROM: 02/18/14 00:01 - 02/19/14 00:01
     TYPE 030 04   41732 RECORDS FROM: 02/18/14 00:01 - 02/19/14 00:01
     TYPE 030 05    6884 RECORDS FROM: 02/18/14 00:01 - 02/19/14 00:01
     TYPE 042 01       3 RECORDS FROM: 02/18/14 00:15 - 02/18/14 02:15
     TYPE 042 02     277 RECORDS FROM: 02/18/14 00:30 - 02/19/14 00:00
     TYPE 042 04     251 RECORDS FROM: 02/18/14 00:01 - 02/18/14 02:04
     TYPE 042 05      50 RECORDS FROM: 02/18/14 00:30 - 02/19/14 00:00
     TYPE 042 06  739672 RECORDS FROM: 02/18/14 00:01 - 02/19/14 00:01
     TYPE 042 09       1 RECORDS FROM: 02/18/14 00:47 - 02/18/14 00:47
     TYPE 042 24    6103 RECORDS FROM: 02/18/14 00:01 - 02/19/14 00:01
CP3KUTIL SYSID: SYSB MVS:           RMF: V0R0M
     TYPE 002          1 RECORDS FROM: 03/11/14 13:04 - 03/11/14 13:04
     TYPE 003          1 RECORDS FROM: 03/11/14 13:12 - 03/11/14 13:12
       ------ PROCESSING PGN001   DATASET ----->
<----------- PGN001   DATASET PROCESSED
CP3KT30M: NO T30M001  PROCESSING REQUESTED
CP3KEXTR: PROCESSING COMPLETE
```

Import EDF Files Or Open Previous Study

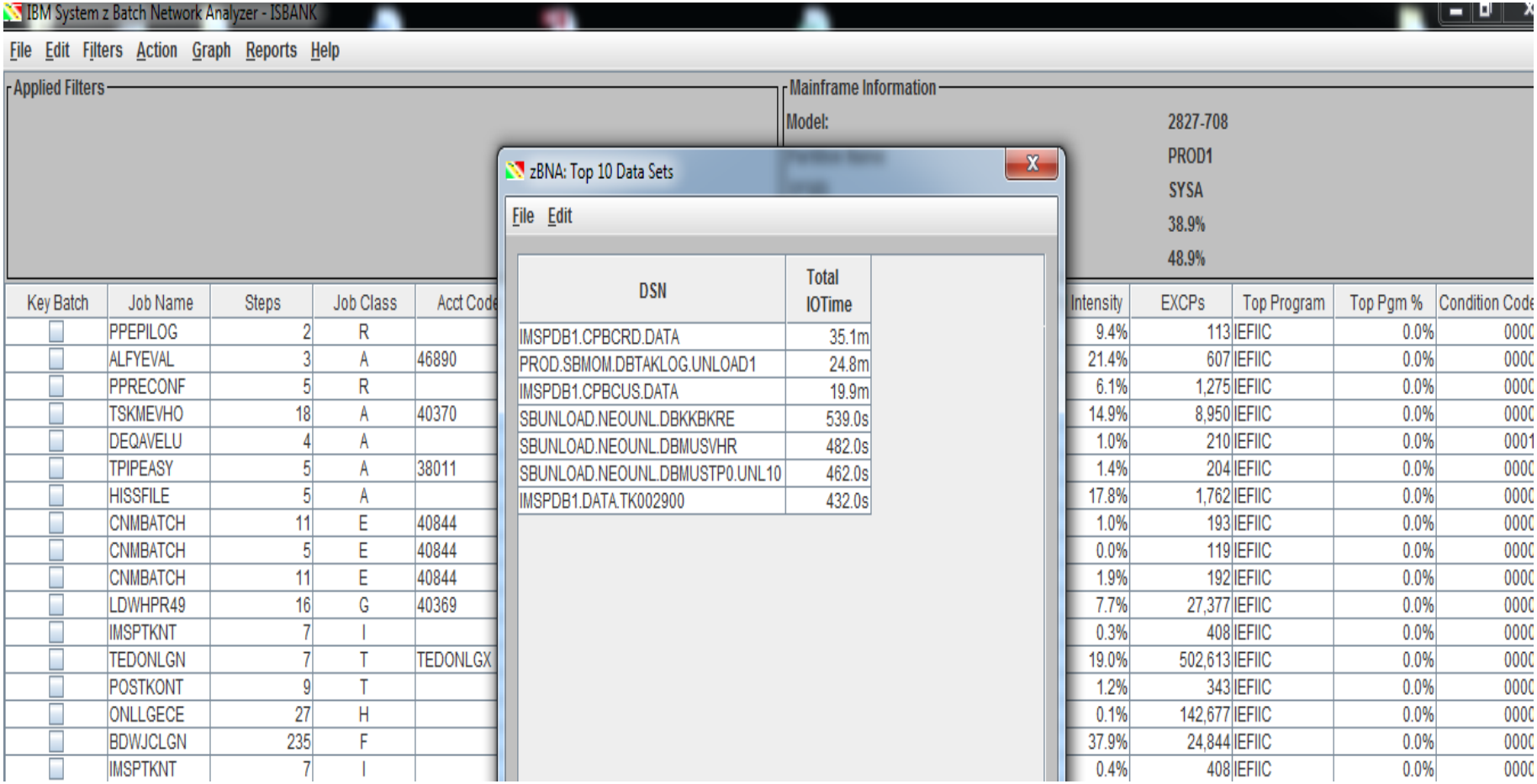


First Panel After Import Or Open Previous Study

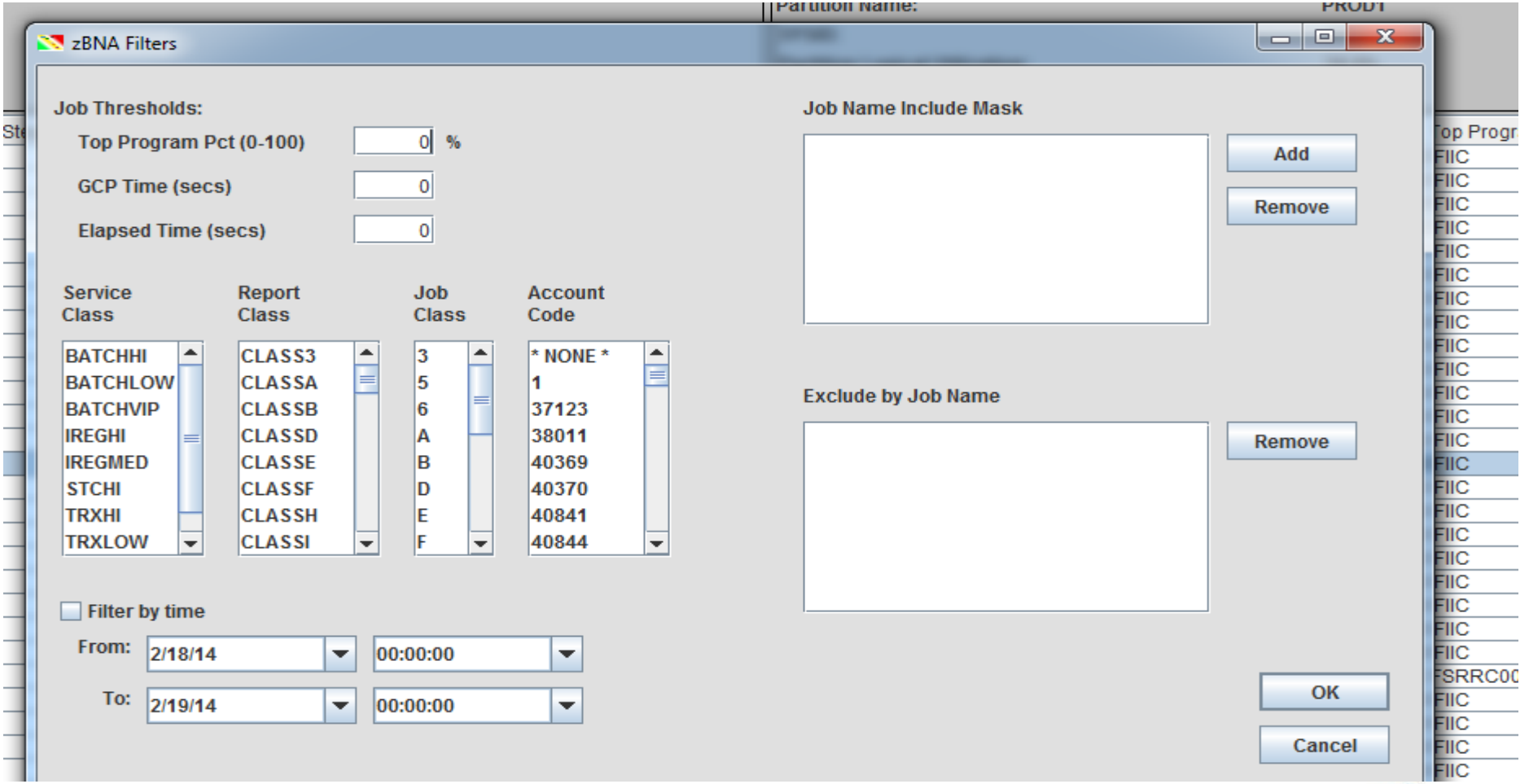


Key Batch	Job Name	Steps	Job Class	Acct Code	Service Cla...	Elapsed Ti...	CPU Ti...	zAAP Time	zIIP Time	CPU Intens...	EXCPs	Top Program	Top Pgm %	Condition ...
	GUNSONA8	178	S		STCHI	2.4h	435.3s	0.0s	0.0s	5.1%	4,924,752	IEFIIC	0.0%	0000
	GUNSONA4	178	S		STCHI	2.0h	330.8s	0.0s	0.0s	4.5%	4,116,546	IEFIIC	0.0%	0000
	GUNSON41	178	S		STCHI	1.2h	179.7s	0.0s	0.0s	4.1%	2,236,628	IEFIIC	0.0%	0000
	GUNSON27	178	S		STCHI	47.1m	168.9s	0.0s	0.0s	6.0%	2,346,976	IEFIIC	0.0%	0000
	GUNSON62	178	S		STCHI	1.1h	160.6s	0.0s	0.0s	4.1%	2,098,582	IEFIIC	0.0%	0000
	GUNSON08	178	S		STCHI	43.9m	146.2s	0.0s	0.0s	5.5%	2,029,375	IEFIIC	0.0%	0000
	GUNSON39	178	S		STCHI	38.9m	141.8s	0.0s	0.0s	6.1%	2,004,432	IEFIIC	0.0%	0000
	GUNSON54	178	S		STCHI	44.2m	139.1s	0.0s	0.0s	5.2%	1,833,887	IEFIIC	0.0%	0000
	GUNSON51	178	S		STCHI	1.2h	135.8s	0.0s	0.0s	3.1%	1,800,294	IEFIIC	0.0%	0000
	GUNSON43	178	S		STCHI	48.0m	135.5s	0.0s	0.0s	4.7%	1,804,833	IEFIIC	0.0%	0000
	GUNSON64	178	S		STCHI	50.7m	134.1s	0.0s	0.0s	4.4%	1,836,790	IEFIIC	0.0%	0000
	GUNSON48	178	S		STCHI	1.1h	133.8s	0.0s	0.0s	3.5%	1,795,767	IEFIIC	0.0%	0000
	GUNSON63	178	S		STCHI	43.8m	121.1s	0.0s	0.0s	4.6%	1,671,877	IEFIIC	0.0%	0000
	GUNSON32	178	S		STCHI	1.1h	115.1s	0.0s	0.0s	3.0%	1,506,356	IEFIIC	0.0%	0000
	GUNSONA3	178	S		STCHI	41.6m	114.8s	0.0s	0.0s	4.6%	1,777,642	IEFIIC	0.0%	0000
	GUNSON83	178	S		STCHI	40.7m	113.9s	0.0s	0.0s	4.7%	1,550,312	IEFIIC	0.0%	0000
	GUNSON46	178	S		STCHI	55.6m	111.7s	0.0s	0.0s	3.3%	1,526,744	IEFIIC	0.0%	0000
	GUNSON22	178	S		STCHI	51.7m	110.5s	0.0s	0.0s	3.6%	1,485,046	IEFIIC	0.0%	0000
	GUNSON80	178	S		STCHI	53.9m	108.6s	0.0s	0.0s	3.4%	1,419,110	IEFIIC	0.0%	0000
	GUNSON77	178	S		STCHI	34.7m	107.1s	0.0s	0.0s	5.1%	1,395,090	IEFIIC	0.0%	0000

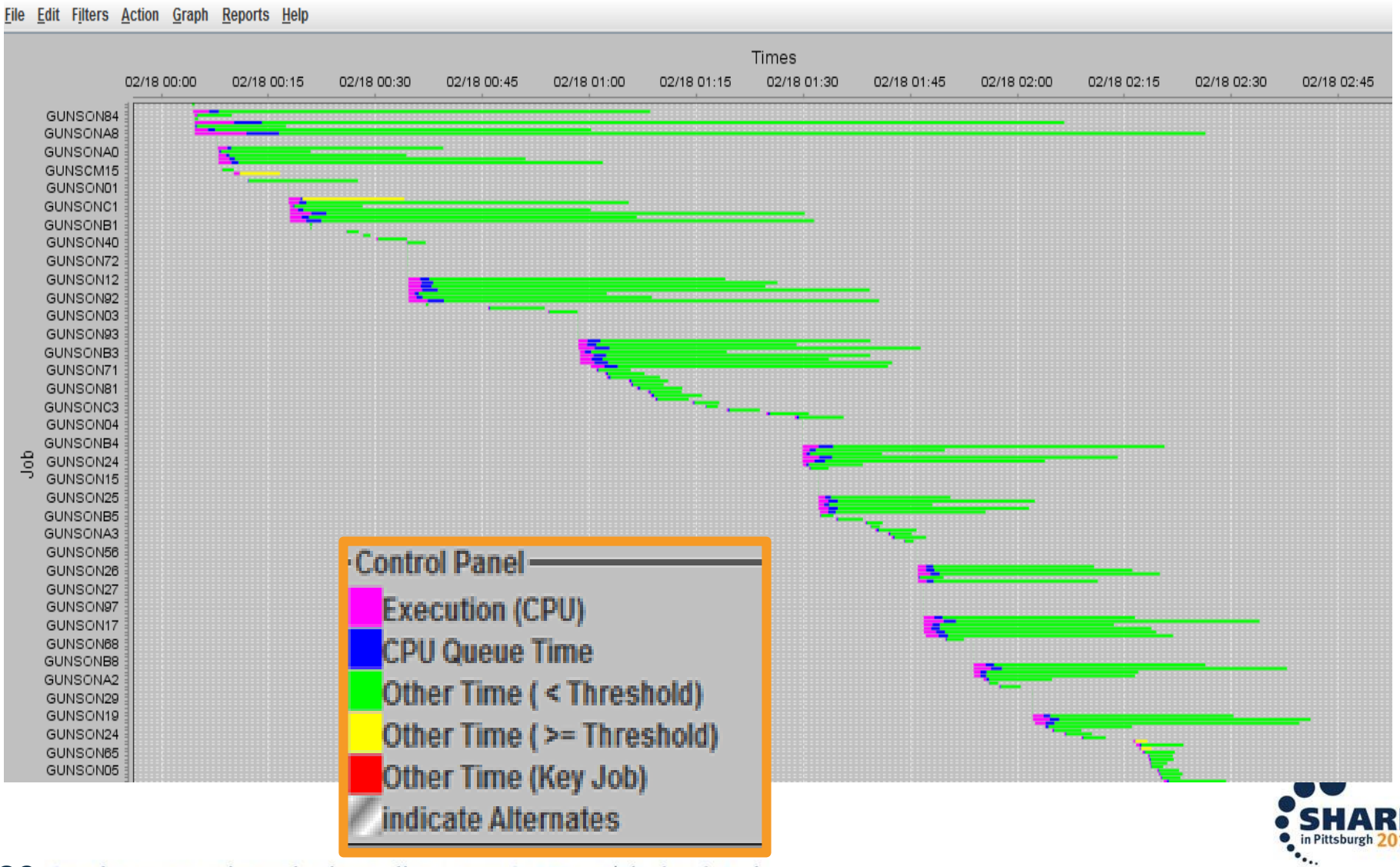
Top 10 Dataset Reports



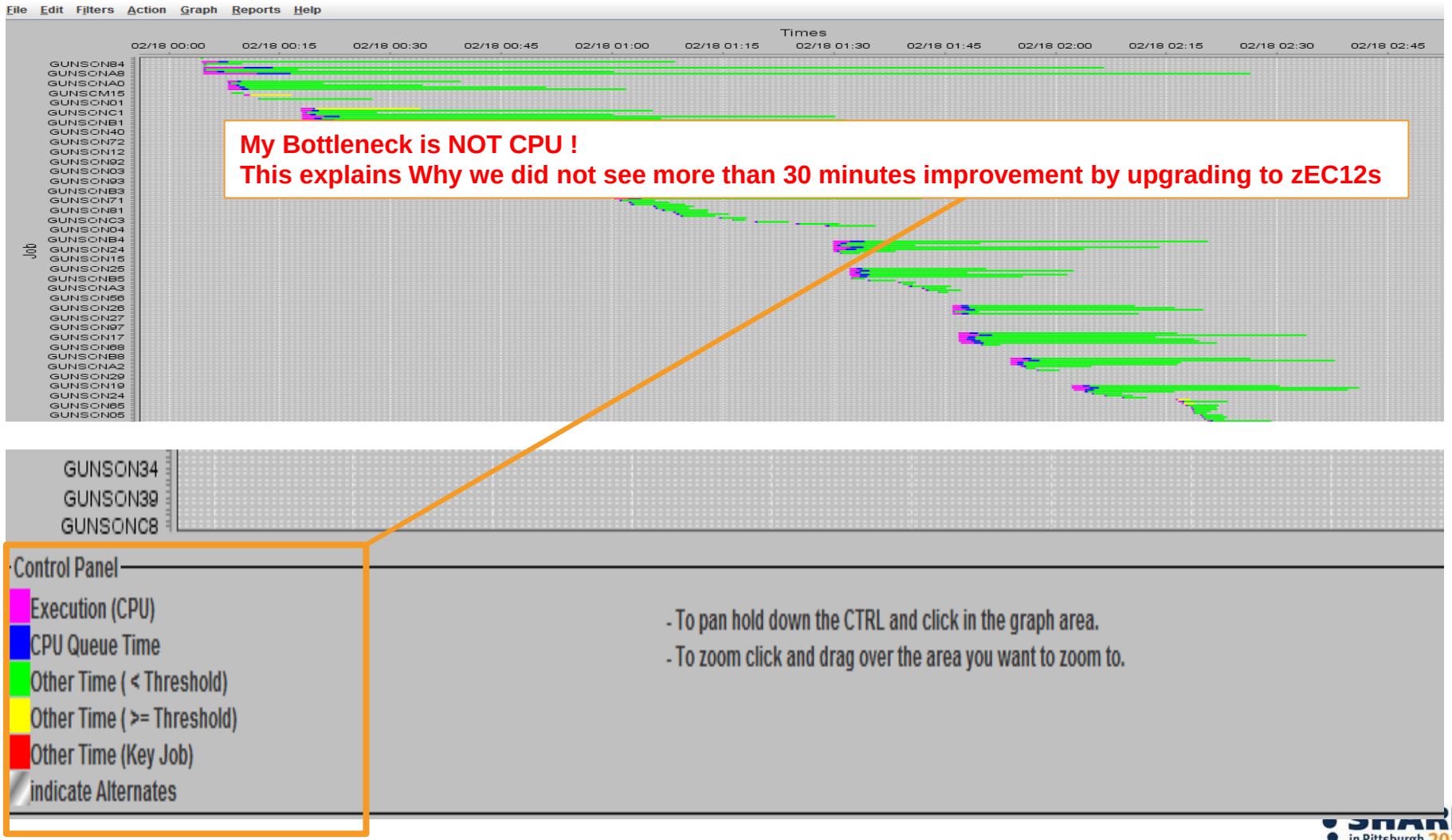
Job Filtering



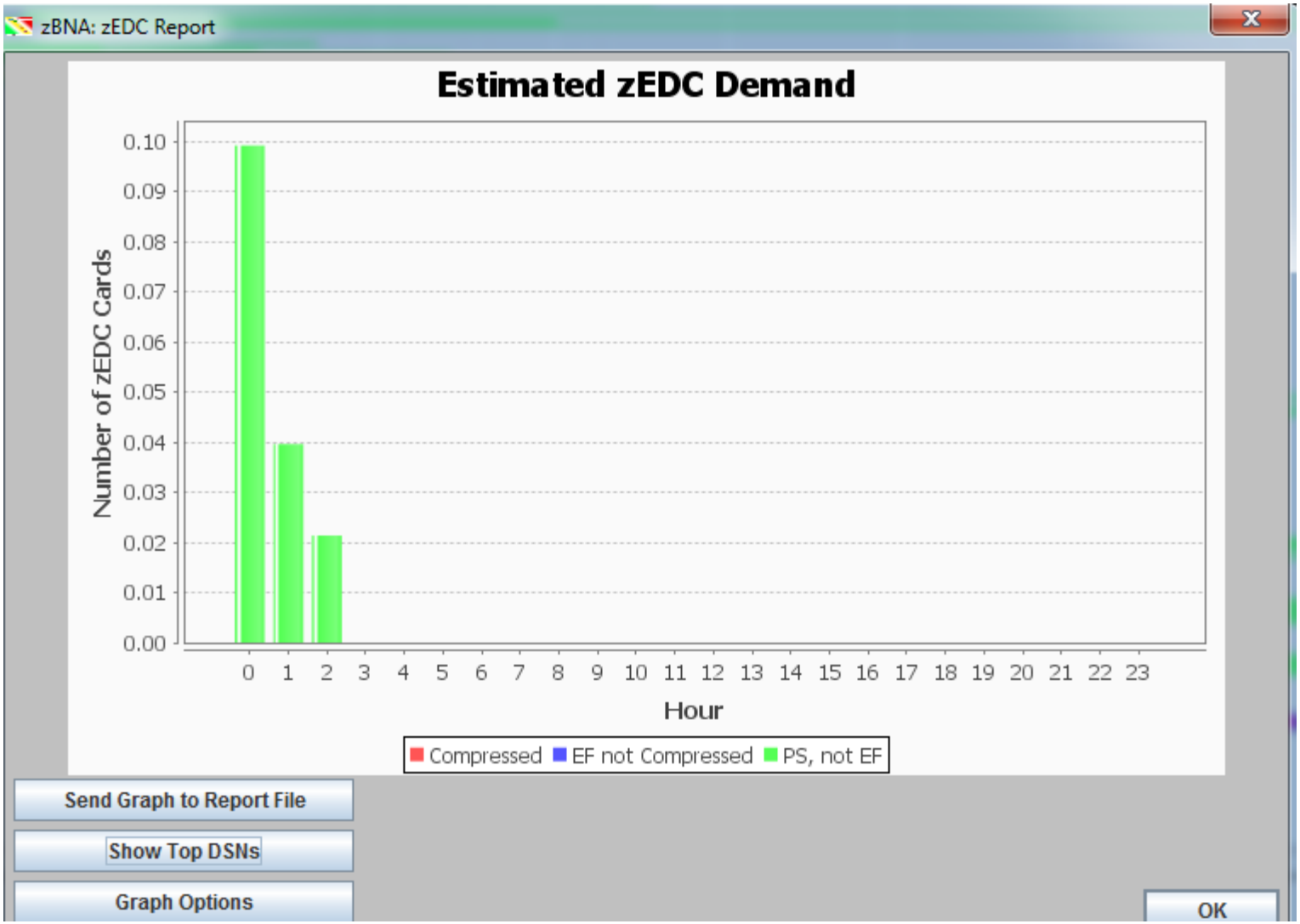
Display Graph Filter by jobname mask (Gun*= My EOD Job mask)



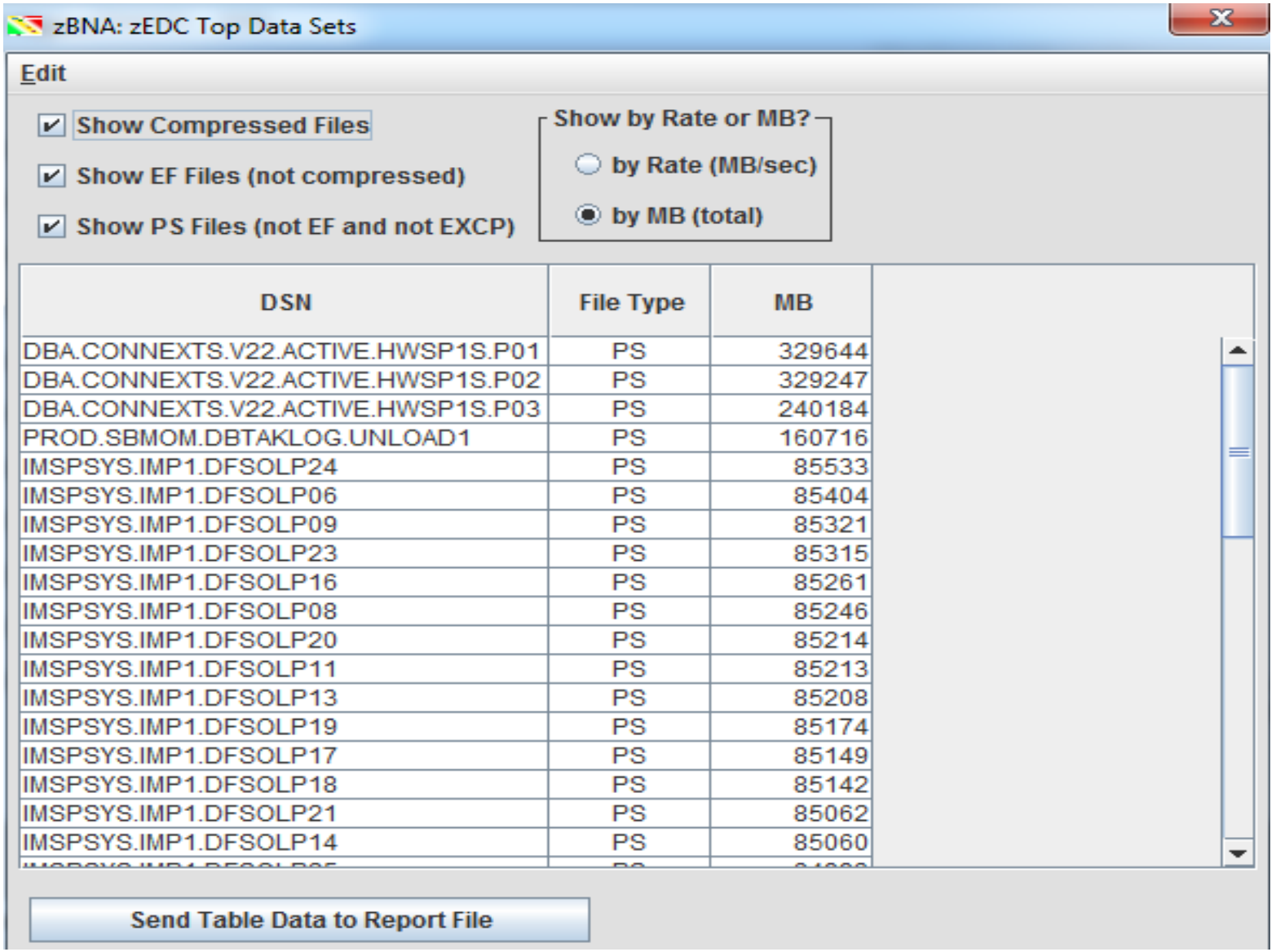
What Does This Mean ?



Estimate zEDC



Estimate zEDC



Sort - ElapseTime

Longest ElapseTime -> GUNSONA8

IBM System z Batch Network Analyzer - ISBANK

File Edit Filters Action Graph Reports Help

Applied Filters

JOB NAMES: GUN*

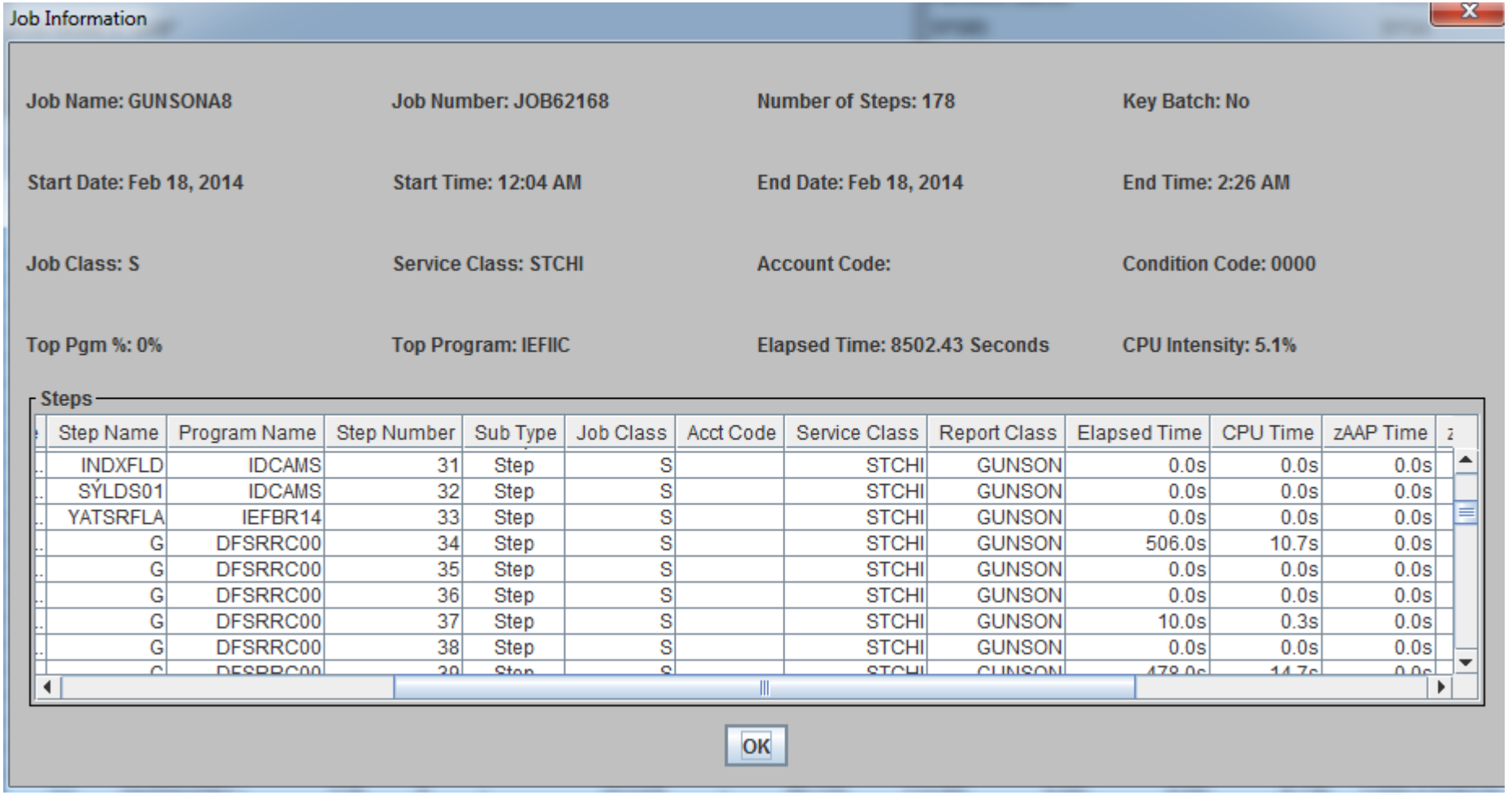
Mainframe Information

Model:	2827-708
Partition Name:	PROD1
SYSID:	SYSA
Partition Logical Utilization:	38.9%
CPC Utilization:	48.9%

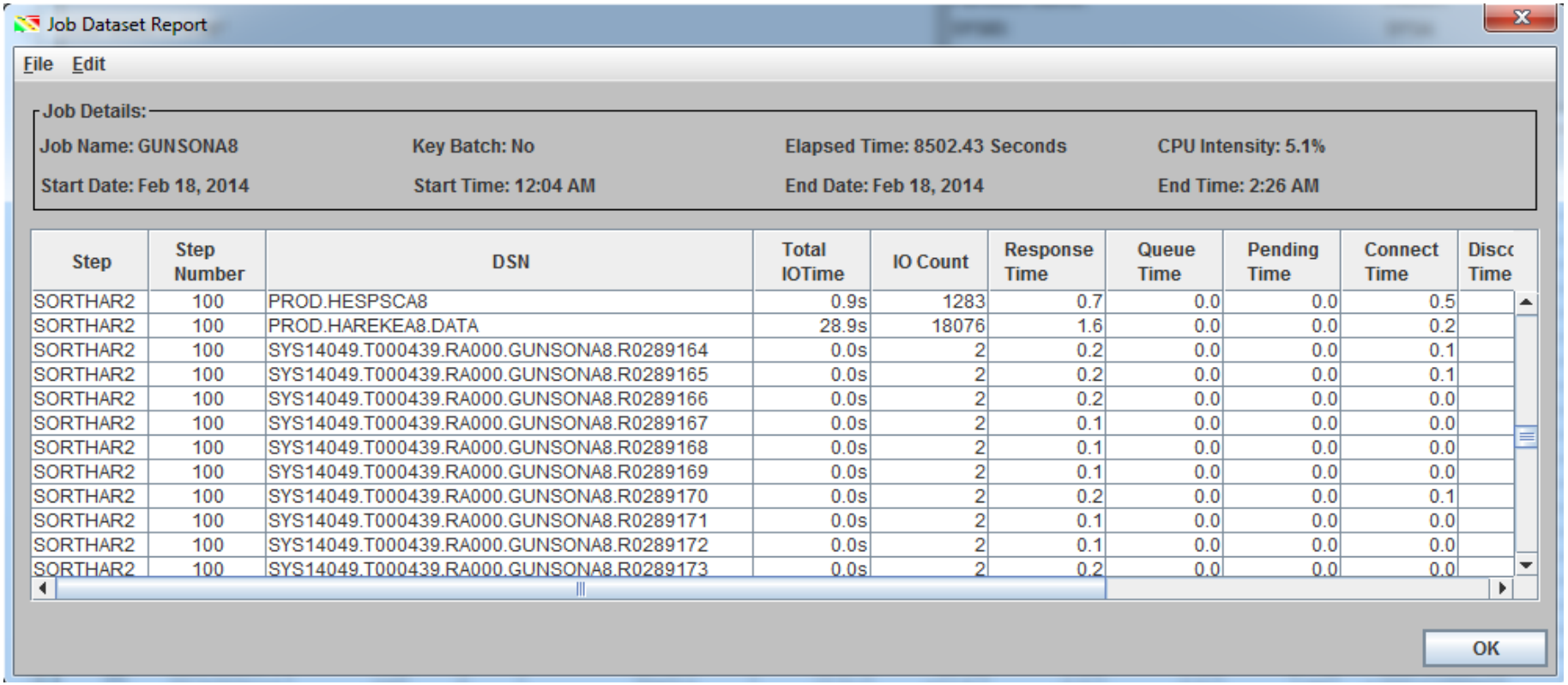
Key Batch	Job Name	Steps	Job Class	Acct Code	Service Class	Elapsed Ti...	CPU Time	zAAP Time	zIIP Time	CPU Intensity	EXCPs	Top Program	Top Pgm %	Condition Code
	GUNSONA8	178	S		STCHI	2.4h	435.3s	0.0s	0.0s	5.1%	4,924,752	IEFIIC	0.0%	0000
	GUNSONA4	178	S		STCHI	2.0h	330.8s	0.0s	0.0s	4.5%	4,116,546	IEFIIC	0.0%	0000
	GUNSON51	178	S		STCHI	1.2h	135.8s	0.0s	0.0s	3.1%	1,800,294	IEFIIC	0.0%	0000
	GUNSON41	178	S		STCHI	1.2h	179.7s	0.0s	0.0s	4.1%	2,236,628	IEFIIC	0.0%	0000
	GUNSON62	178	S		STCHI	1.1h	160.6s	0.0s	0.0s	4.1%	2,098,582	IEFIIC	0.0%	0000
	GUNSON32	178	S		STCHI	1.1h	115.1s	0.0s	0.0s	3.0%	1,506,356	IEFIIC	0.0%	0000
	GUNSON48	178	S		STCHI	1.1h	133.8s	0.0s	0.0s	3.5%	1,795,767	IEFIIC	0.0%	0000
	GUNSON46	178	S		STCHI	55.6m	111.7s	0.0s	0.0s	3.3%	1,526,744	IEFIIC	0.0%	0000
	GUNSON80	178	S		STCHI	53.9m	108.6s	0.0s	0.0s	3.4%	1,419,110	IEFIIC	0.0%	0000
	GUNSON22	178	S		STCHI	51.7m	110.5s	0.0s	0.0s	3.6%	1,485,046	IEFIIC	0.0%	0000
	GUNSON64	178	S		STCHI	50.7m	134.1s	0.0s	0.0s	4.4%	1,836,790	IEFIIC	0.0%	0000
	GUNSON02	178	S		STCHI	50.1m	102.9s	0.0s	0.0s	3.4%	1,350,744	IEFIIC	0.0%	0000

Details Of GUNSONA8 JOB

You need to add step details before using this panel

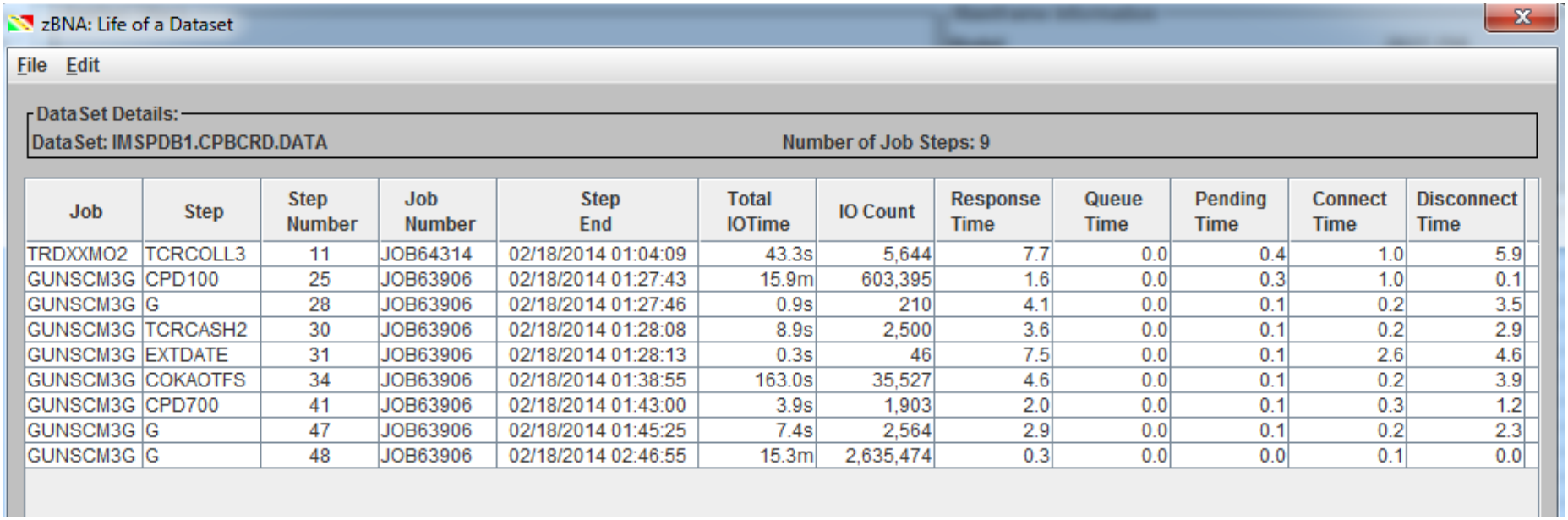


Job Dataset Report



Step	Step Number	DSN	Total IOTime	IO Count	Response Time	Queue Time	Pending Time	Connect Time	Disc Time
SORTHAR2	100	PROD.HESPSCA8	0.9s	1283	0.7	0.0	0.0	0.5	
SORTHAR2	100	PROD.HAREKEA8.DATA	28.9s	18076	1.6	0.0	0.0	0.2	
SORTHAR2	100	SYS14049.T000439.RA000.GUNSONA8.R0289164	0.0s	2	0.2	0.0	0.0	0.1	
SORTHAR2	100	SYS14049.T000439.RA000.GUNSONA8.R0289165	0.0s	2	0.2	0.0	0.0	0.1	
SORTHAR2	100	SYS14049.T000439.RA000.GUNSONA8.R0289166	0.0s	2	0.2	0.0	0.0	0.0	
SORTHAR2	100	SYS14049.T000439.RA000.GUNSONA8.R0289167	0.0s	2	0.1	0.0	0.0	0.0	
SORTHAR2	100	SYS14049.T000439.RA000.GUNSONA8.R0289168	0.0s	2	0.1	0.0	0.0	0.0	
SORTHAR2	100	SYS14049.T000439.RA000.GUNSONA8.R0289169	0.0s	2	0.1	0.0	0.0	0.0	
SORTHAR2	100	SYS14049.T000439.RA000.GUNSONA8.R0289170	0.0s	2	0.2	0.0	0.0	0.1	
SORTHAR2	100	SYS14049.T000439.RA000.GUNSONA8.R0289171	0.0s	2	0.1	0.0	0.0	0.0	
SORTHAR2	100	SYS14049.T000439.RA000.GUNSONA8.R0289172	0.0s	2	0.1	0.0	0.0	0.0	
SORTHAR2	100	SYS14049.T000439.RA000.GUNSONA8.R0289173	0.0s	2	0.2	0.0	0.0	0.0	

Life Of Dataset


zBNA: Life of a Dataset

File Edit

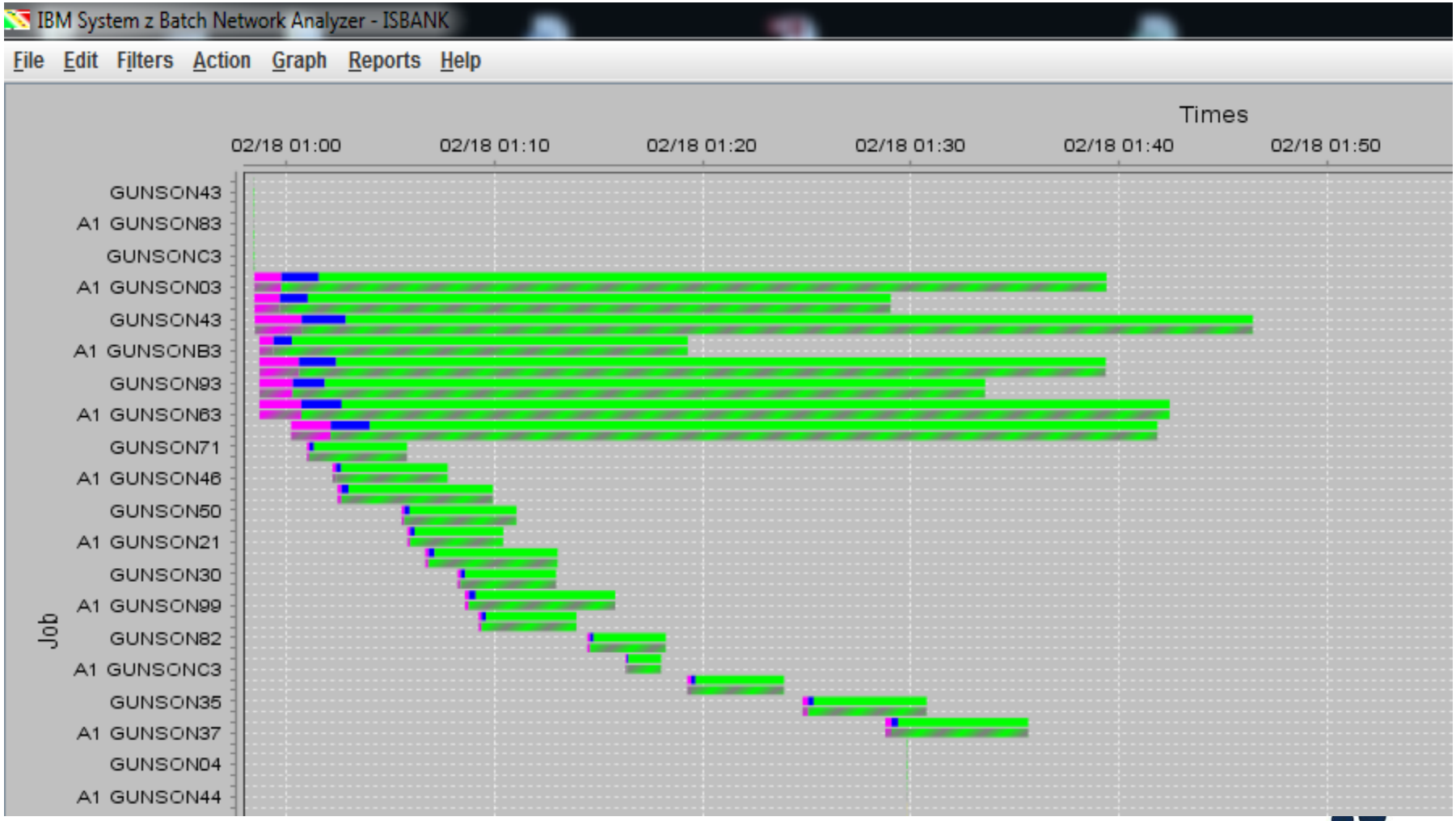
Data Set Details:

Data Set: IMSPDB1.CPBCRD.DATA Number of Job Steps: 9

Job	Step	Step Number	Job Number	Step End	Total IOTime	IO Count	Response Time	Queue Time	Pending Time	Connect Time	Disconnect Time
TRDXXMO2	TCRCOLL3	11	JOB64314	02/18/2014 01:04:09	43.3s	5,644	7.7	0.0	0.4	1.0	5.9
GUNSCM3G	CPD100	25	JOB63906	02/18/2014 01:27:43	15.9m	603,395	1.6	0.0	0.3	1.0	0.1
GUNSCM3G	G	28	JOB63906	02/18/2014 01:27:46	0.9s	210	4.1	0.0	0.1	0.2	3.5
GUNSCM3G	TCRCASH2	30	JOB63906	02/18/2014 01:28:08	8.9s	2,500	3.6	0.0	0.1	0.2	2.9
GUNSCM3G	EXTDATE	31	JOB63906	02/18/2014 01:28:13	0.3s	46	7.5	0.0	0.1	2.6	4.6
GUNSCM3G	COKAOTFS	34	JOB63906	02/18/2014 01:38:55	163.0s	35,527	4.6	0.0	0.1	0.2	3.9
GUNSCM3G	CPD700	41	JOB63906	02/18/2014 01:43:00	3.9s	1,903	2.0	0.0	0.1	0.3	1.2
GUNSCM3G	G	47	JOB63906	02/18/2014 01:45:25	7.4s	2,564	2.9	0.0	0.1	0.2	2.3
GUNSCM3G	G	48	JOB63906	02/18/2014 02:46:55	15.3m	2,635,474	0.3	0.0	0.0	0.1	0.0

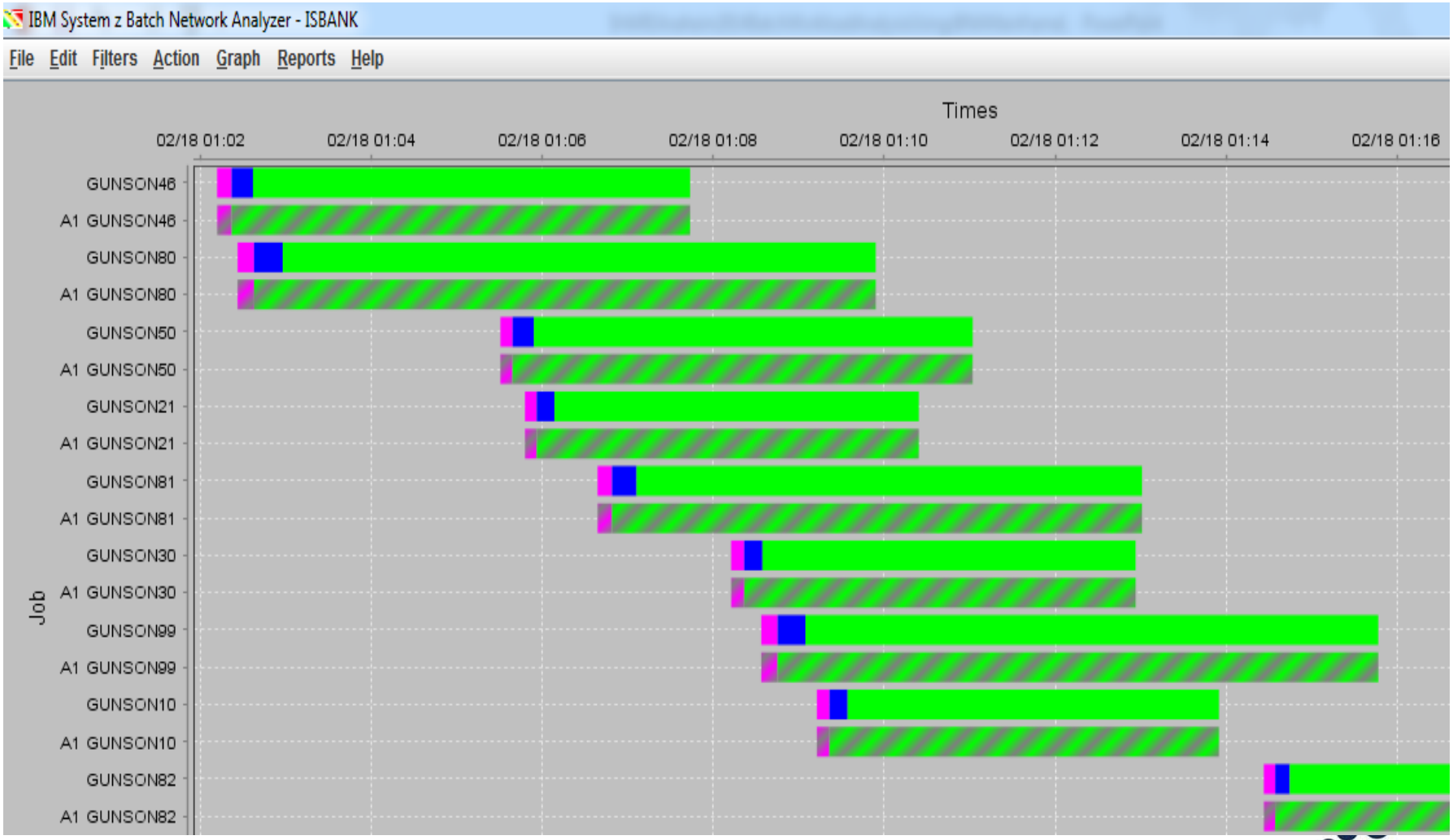
What If Upgrading From 2827-708 To 2827-710

- **A1's in graph shows effect of upgrade**



What If Upgrading From 2827-708 To 2827-710

- **A1's in graph shows effect of upgrade**



Generate Graph Report For `What If Analysis` (html)

The analysis follows:

Data

There are 199 jobs in the following table.

Name	Line	Key	Job Name	Program Name	Start	End	Steps	Job Class	Acct Code	Serv Class	Elapsed Time	CPU Time	Top Program	Top Pgm %
B	1		GUNSON46	DFSRRC00	2/18/14 12:04 AM	2/18/14 12:04 AM	1	S		STCHI	21	0	IEFIIC	0
A1	1		GUNSON46	DFSRRC00	2/18/14 12:04 AM	2/18/14 12:04 AM	1	S		STCHI	21(0.0%)	0		
A2	1		GUNSON46	DFSRRC00	2/18/14 12:04 AM	2/18/14 12:04 AM	1	S		STCHI	21(0.0%)	0		
B	2		GUNSCM1C		2/18/14 12:04 AM	2/18/14 12:04 AM	8	S	99999A	BATCHVIP	0	0	IEFIIC	0
A1	2		GUNSCM1C		2/18/14 12:04 AM	2/18/14 12:04 AM	8	S	99999A	BATCHVIP	0(0.0%)	0		
A2	2		GUNSCM1C		2/18/14 12:04 AM	2/18/14 12:04 AM	8	S	99999A	BATCHVIP	0(0.0%)	0		
B	3		GUNSON48		2/18/14 12:04 AM	2/18/14 1:08 AM	178	S		STCHI	3,845	134	IEFIIC	0
A1	3		GUNSON48		2/18/14 12:04 AM	2/18/14 1:08 AM	178	S		STCHI	3,845(0.0%)	133		
A2	3		GUNSON48		2/18/14 12:04 AM	2/18/14 1:08 AM	178	S		STCHI	3,845(0.0%)	133		
B	4		GUNSON84		2/18/14 12:04 AM	2/18/14 12:09 AM	171	S		STCHI	312	20	IEFIIC	0
A1	4		GUNSON84		2/18/14 12:04 AM	2/18/14 12:09 AM	171	S		STCHI	312(0.0%)	20		
A2	4		GUNSON84		2/18/14 12:04 AM	2/18/14 12:09 AM	171	S		STCHI	312(0.0%)	20		
B	5		GUNSONCB		2/18/14 12:04 AM	2/18/14 12:05 AM	2	S		STCHI	28	0	IEFIIC	0
A1	5		GUNSONCB		2/18/14 12:04 AM	2/18/14 12:05 AM	2	S		STCHI	28(0.0%)	0		
A2	5		GUNSONCB		2/18/14 12:04 AM	2/18/14 12:05 AM	2	S		STCHI	28(0.0%)	0		
B	6		GUNSONA4		2/18/14 12:04 AM	2/18/14 2:06 AM	178	S		STCHI	7,313	331	IEFIIC	0
A1	6		GUNSONA4		2/18/14 12:04 AM	2/18/14 2:06 AM	178	S		STCHI	7,312(-0.0%)	330		
A2	6		GUNSONA4		2/18/14 12:04 AM	2/18/14 2:06 AM	178	S		STCHI	7,312(-0.0%)	330		
B	7		GUNSONA1		2/18/14 12:04 AM	2/18/14 12:17 AM	204	S		STCHI	768	5	IEAVAR00	0

Special Thanks To …

John Burg - IBM WSC