

# Batch Automation and Job Scheduling – A New Collaboration

*ThruPut*  
**Manager AE**

Session: 13142

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MVS Solutions is a software company that focuses entirely on batch management in the world of z/OS and JES2

- ThruPut Manager has provided control of batch for 25 years
- TM AE (Automation Edition) provides service driven batch management using our automation engine
- TM AE capacity management allows sites to reduce their software licensing costs with IBM, in the context of sub-capacity pricing
- TM AE+ adds the Production Control Services component (PCS) which integrates our automation engine with CA Workload Automation CA 7 Edition to extend your scheduling goals into the z/OS execution phase


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- ThruPut Manager SE has been around more than 25 years.
- ThruPut Manager AE was released about 5 years ago and is managing the batch in many sites today.
- Capacity management is a recent addition to ThruPut Manager AE and manages batch so as to allow the installation to lower their soft cap and reduce their MSU usage and therefore the monthly fee to IBM
- ThruPut Manager AE+ is the newest addition to the AE world. It communicates directly with CA 7 so that jobs can be managed in context of their application, its importance and its due-out requirements.

# ThruPut Manager Essentials




## CA Validation



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- MVS Solutions Inc. is CA Technologies Partner
- CA Validation for:  
ThruPut Manager AE+ with CA 7
- CA Validation Program
  - standard process for verifying the integrated solution
  - correctly installs, configures and performs



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## Agenda

- ThruPut Manager Evolution
- The vision
- The schedule
- Running the schedule
- Viewing the schedule
  - Application view
  - Job Instance view
- Dealing with problems

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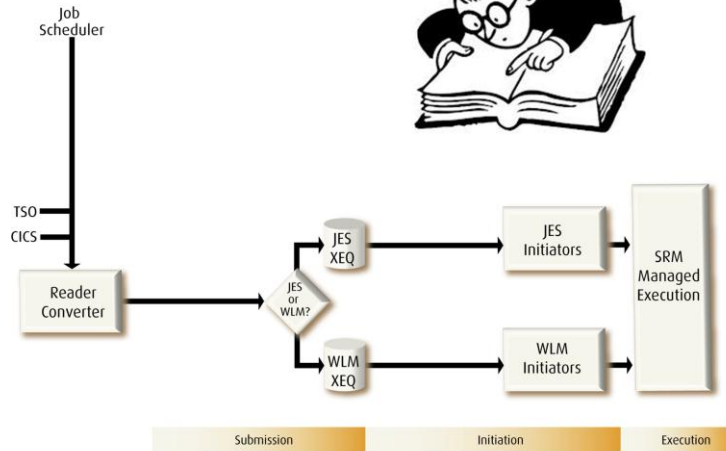
## ThruPut Manager Evolution

- Without ThruPut Manager, all controls are manual and rely on everybody playing by the same rules

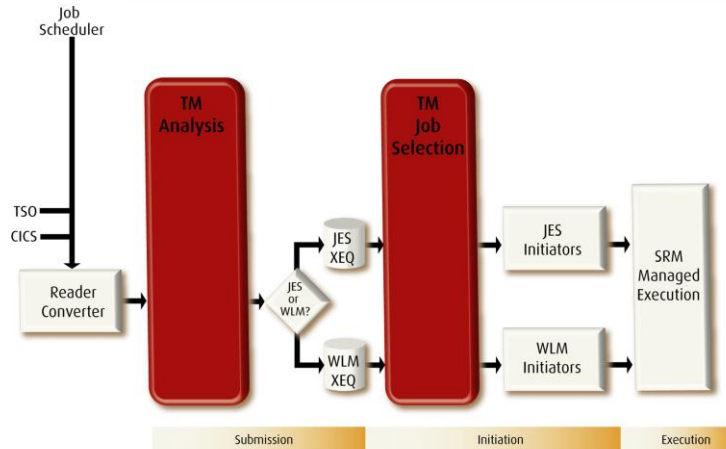


- With ThruPut Manager SE, control is via a programming language (JAL)... **IF MY-JOB THEN SET SERVICE\_CLASS(VHIPRTY)**
- With ThruPut Manager AE, control is via a goal based policy plus some JAL... **TARGET=2 ACCEPTABLE=5**
- With ThruPut Manager AE+, control is derived from the CA 7 schedule for production jobs and is the same as AE for ad-hoc jobs.

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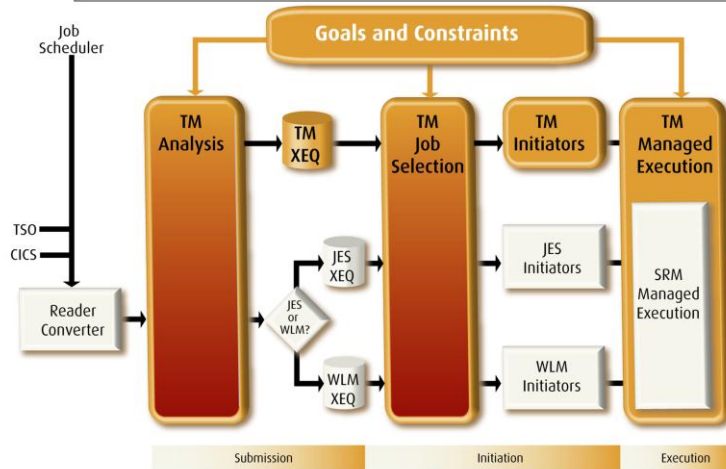


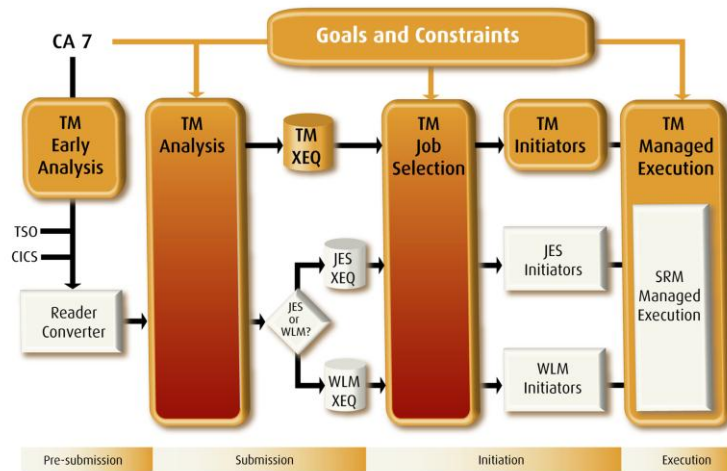
IF MY-JOB THEN SET SERVICE\_CLASS(VHIPRTY)



## With ThruPut Manager AE

TARGET=2 ACCEPTABLE=5





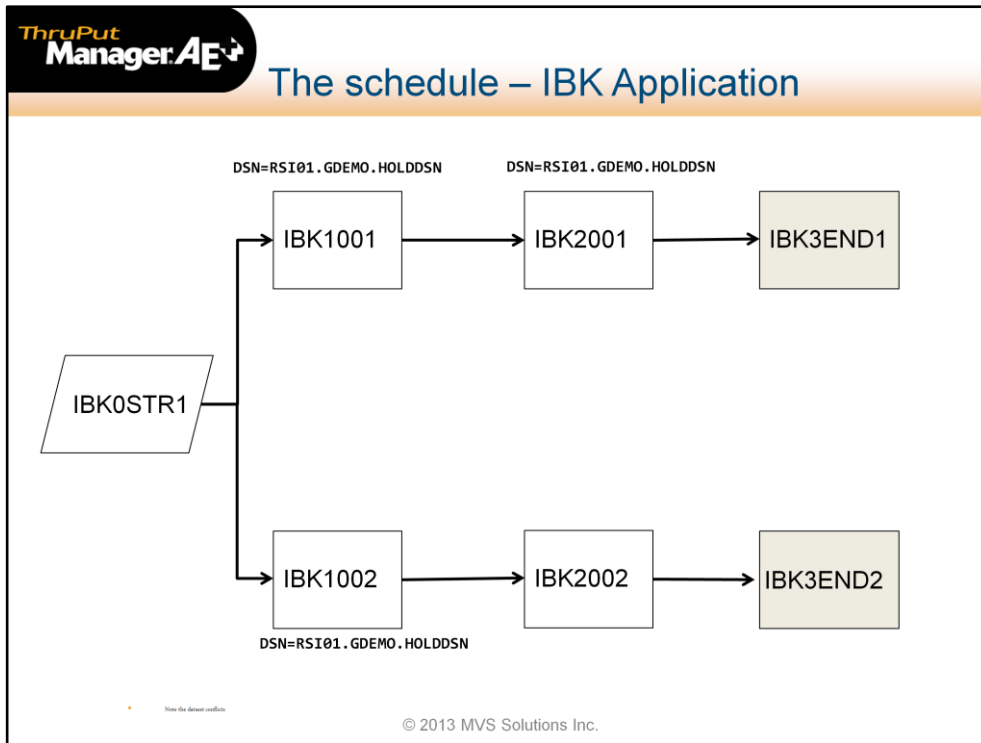
Batch processing has become too complex for users and operators to manage without automation

- Good job scheduling software such as CA 7 is required but does not provide a complete answer
- Automation within z/OS and JES2 is needed to ensure production applications meet the CA 7 schedule goals
- ThruPut Manager AE+ works hand in glove with CA 7 and z/OS & JES2 to deliver your schedule goals automatically and provide that complete answer

- 40 years ago an operator would run 50 – 60 jobs per night and know every one. That was becoming impossible 25 years ago when the workload might be a few hundred to 2000 jobs. It is impossible today, when many installations run 20,000 to 100,000 jobs per day through their scheduler.
- CA7 is itself an application, outside of z/OS and JES2 ,and has little or no influence on the processing once a job is submitted
- PCS provides the link between CA7 and the z/OS world so that the entire schedule is automated from schedule generation through to the end of the production cycle.

- The scheduled applications are very simple
- An application is equivalent to a system name in CA 7
- A tree is all the jobs between a header job and all its trailers
  - An application can have multiple trees
- A path is all the jobs between a header job and a single trailer
- An application always has an urgent path – the path with the least amount of slack time
  - The urgent path often changes during processing

- This presentation is based on a small and simple CA7 database used for demos to illustrate what PCS is doing.
- Slack time is an important concept in PCS and is recalculated continually for each path as jobs end.



- This is one example of a simple application, with 1 tree and 2 paths.
- This application has three jobs that require exclusive use of the same dataset, leading to contention situations.

## Running the schedule with AE+


- Before starting each production cycle (usually 24 hours), you run a batch job to collect schedule data
- Job issues CCI commands to discover which jobs are scheduled, when jobs are to be submitted, and what has happened recently
- Output from job populates the PCS *Battle Plan*

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- Of course there are setup tasks to be done for PCS. The first time only that PCS comes up, it asks CA7 for the list of system names and then the list of jobs in each system, which it uses to populate its Application Management Database or AMD
- If necessary you can refresh the list of applications
- In the AMD dialog you can set due-out times and Production Importance (PI) for any application
- As jobs are run, PCS captures experience data at the step level, including the elapsed time, CPU usage, and number of tape drives actually used (including dynamic allocation)
- On a daily – or production cycle – basis, you run the batch job to capture the schedule data for that period.
- That data is combined with the AMD data and our experience data to build a “Battle Plan”, in which every application, tree and path in the schedule is calculated for its expected runtime and its ability to meet the due-out time

- PCS manages the jobs in the schedule based on the information in the Battle Plan and its own analysis. It manages:
  - The JES2 queue position
  - Preparation of jobs (VVS staging, HSM recall, ...) while in the queue
  - Tape drive availability
  - Selection of jobs
  - Dataset contention situations
  - Initiator availability
  - Assigning the Service Class
- Today we'll focus on the external view

- PCS manages selection priority based on the “rerun factor” (how much time is there to rerun this job/path/tree in the event of a problem, expressed as a number, with 1 meaning the job/path/tree could be rerun once), the slack time and the Production Importance
  - Note slack time and rerun factor are dynamically recalculated as each job completes or fails to start when expected
- Jobs are prepared to run while in the queue so that they can run immediately and without delays once selected
- Tape drives are dynamically managed based on the needs of the job and the real availability of drives
- Dataset contention is dynamically managed when a job is selected. A job may be held back if its datasets are not available, rather than letting it occupy an initiator. Jobs held back are released based on Importance
- The WLM Service Class is assigned as the job goes into execution, from a set that is dedicated to ThruPut Manager



## Viewing the schedule

- Action

Glossary Help

----- TM/PCS Services -----

View Active Battle Plan

Command ==>

Production Cycle Name: FRI

Description: 24 hr

Type: Day of Week (Fri)

Cycle Date/Time - From: Sep 30,2011 14:00

To: Oct 01,2011 13:59

Activated: Sep 30,2011 13:56

by: \*\*Auto\*\*

Current Date/Time: Sep 30,2011 15:16:33

Time Remaining in Cycle: 22:43:27

	-Applications-	-Job Trees-	-Job Paths-	-Job Instances-	
				Total	Culprits
Is Late:	0	0	1	7	0
Will be Late:	1	1	1	5	
Was Late:	1	1	2	3	
To-Do:	88	88	242	694	
Done:	8	10	26	83	
Total:	96	98	268	777	
Adhoc:				0	

For Detailed Battle Plan Information, Select one of the following:

1 Starting with All Applications

2 Starting with All Job Instances

\* Starting with All Culprit Job Instances

X Exit

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- This is the ‘dashboard’, the panel that gives a quick overview of your current status, and is always the place to start
- Note the term ‘Job Instance’. This refers to a combination of the jobname and schedule id, as in IAP2001\_001
- Note also the term ‘Culprit’. This refers to jobs that are the cause of other jobs being late
- The panel shows how many applications, trees, paths, and job instances are late, are calculated as will be late and were late
- It shows the total number of entities in the schedule, how many are done and how many are still to be run
- It also shows the number of ‘Adhoc’ jobs. These are jobs submitted by CA 7, probably as a result of being DEMANDED in, that were not in the schedule. These jobs do not have a slack time and do not belong to a path or tree, since there is no information to identify where they fit. However they do have a system name so do belong to an application and will be managed with the importance of that application

## Viewing the schedule – by application

```

- GoTo  View  Filter  Sort                                Glossary  Help
----- TM/PCS Services -----
View Active Battle Plan Applications

Command ==>                                           Scroll ==> CSR

Cycle Date/Time - From: Sep 30,2011 14:00      To: Oct 01,2011 13:59
Current Date/Time: Sep 30,2011 15:24:18


Line Commands: S - Display Job Trees    O - View Defaults/Options

Application Name: *                                Sorted by: Application Name
App  P      Exp/Actual-Date/Time  Acceptable  -E/A-----Job Tree Counts-
--Name-- I --Status--  --Starting--  ---Ending---  ---Time---  Elpsd -Late- -Total-Halted
_ AAP    3 Pending    Sep 30 16:03 Sep 30 17:25 Sep 30 17:30 01:22    0    1    0
_ ABK    3 Pending    Oct 01 12:05 Oct 01 12:24 Oct 01 12:30 00:19    0    1    0
_ AMK    2 Pending    Oct 01 12:06 Oct 01 12:31 Oct 01 12:30 00:25    1    1    0
_ ASI    4 Pending    Oct 01 12:05 Oct 01 12:33 Oct 01 13:33 00:28    0    1    0
_ BAP    3 In Progress Sep 30 13:30 Sep 30 17:49 Sep 30 18:04 04:19    0    1    0
_ BBK    3 Pending    Oct 01 12:31 Oct 01 12:49 Oct 01 13:00 00:18    0    1    0
_ BMK    2 Pending    Oct 01 12:30 Oct 01 12:53 Oct 01 13:00 00:23    0    1    0
_ BSI    4 Pending    Oct 01 12:30 Oct 01 12:57 Oct 01 13:00 00:27    0    1    0
_ EAP    3 Pending    Oct 01 13:00 Oct 01 13:19 Oct 01 13:30 00:19    0    1    0
_ EBK    3 Pending    Oct 01 13:05 Oct 01 13:22 Oct 01 13:30 00:17    0    1    0
_ EMK    1 Pending    Oct 01 13:00 Oct 01 13:23 Oct 01 13:30 00:23    0    1    0

```

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- One of the choices is to view the schedule by application
- From this panel you can drill down to see the trees, paths and job instances in the application and their status



## Viewing the schedule – by job instance

----- TM/PCS Services -----

View Active Battle Plan Job Instances

Command ==> Scroll ==> CSR

Cycle Date/Time - From: Sep 30,2011 14:00 To: Oct 01,2011 13:59

Current Date/Time: Sep 30,2011 15:11:21

Line Commands: S-Job Paths P-Detailed Job Paths X-Display Experience

O-View Defaults/Options G-Progress I-Info(TM/UDF) A-Add to R-Remove from

List of All Job Instances in Battle Plan

Job Instance Id: I\* Repeat: Next Sorted by: Job Inst Progress

Job	App	C	-Urgent	Path-	Job Inst	P	
--Instance Id--	--Name--	P	Rerun	Slack	Progress	I	-Status- -----Details-----
IAP2001_001	IAP	C	0.3	00:07	1	3	Pending
ISI1001_001	ISI	C	0.1	00:02	1	4	Failed A-S106
IAP0STR1_001	IAP				0	3	Done
IAP1001_001	IAP	C	0.3	00:07	0	3	Active EXECUTING MVSD/STEP2
IBK2001_001	IBK	C	0.5	00:07	0	2	Ready AWAITING EXECUTION
IBK2002_001	IBK	C	0.4	00:06	0	2	Ready AWAITING EXECUTION
IMK0STR1_001	IMK				0	3	Done
IMK1END5_001	IMK				0	3	Done Triggering Job Cancelled
IBK0STR1_001	IBK				0	2	Done
IBK0001_001	IBK				0	2	Done
IBK1STR1_001	IBK		-0.3	-00:06	C 11	2	Active EXECUTING MVSD/XTRACT
IMK1001_001	IMK				0	3	Done

Line 9 of 432

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- You can also view by Job Instance, as in this panel
- This is the left view of a wide panel (I use 132 for my width under ISPF)
- The panel contains a lot of information from PCS, CA 7, and z/OS . It provides the ability to get more information from CA 7, through use of its commands, and from ThruPut Manager through use of the I (Info) command
- Any non-dialog CA 7 command, such as LQ, LJOB, LRLOG, can be issued on the command line prefixed by forward slash-blank ('/')

## Viewing the schedule – by job instance

```
----- TM/PCS Services -----
View Active Battle Plan Job Instances

Command ==> Scroll ==> CSR

Cycle Date/Time - From: Sep 30,2011 14:00 To: Oct 01,2011 13:59
Current Date/Time: Sep 30,2011 15:11:21

Line Commands: S-Job Paths P-Detailed Job Paths X-Display Experience
O-View Defaults/Options G-Progress I-Info(TM/UDF) A-Add to R-Remove from

List of All Job Instances in Battle Plan Line 9 of 432
Job Instance Id: I* Repeat: Next Sorted by: Job Inst Progress
Job CA-7 CA-7 # of H Exp/Actual Job-Elapsed Step-Elapsed Exp/Actual
--Instance Id--- -Status- Job# Paths T -Start Time- -Exp--Actual -Exp--Actual Ending-Time
_ IAP2001_001 FCAST 2 M Sep 30 15:17 00:32 00:00 00:00 Sep 30 15:49
_ ISI1001_001 A-S106 2669 1 M Sep 30 15:04 00:14 00:04 00:00 00:00 Sep 30 15:18
_ IAP0STR1_001 C0000 2453 2 H Sep 30 13:45 00:27 00:26 00:00 00:00 Sep 30 14:11
_ IAP1001_001 ACT-Q 2578 2 M Sep 30 14:11 01:13 00:04 00:02 Sep 30 15:24
_ IBK2001_001 RDY-S 2654 1 M Sep 30 15:11 00:09 00:00 00:00 Sep 30 15:20
_ IBK2002_001 RDY-S 2656 1 M Sep 30 15:11 00:14 00:00 00:00 Sep 30 15:25
_ IMK0STR1_001 C0000 2514 5 H Sep 30 13:49 00:21 00:21 00:00 00:00 Sep 30 14:10
_ IMK1END5_001 Cancel 1 T Sep 30 14:12 00:07 00:00 00:00 Sep 30 14:12
_ IBK0STR1_001 C0000 2471 2 H Sep 30 14:05 00:32 00:33 00:00 00:00 Sep 30 14:38
_ IBK0001_001 C0000 2489 1 M Sep 30 14:39 00:11 00:11 00:00 00:00 Sep 30 14:50
_ IBK1STR1_001 ACT-Q 2621 4 H Sep 30 14:50 00:15 00:21 00:04 00:09 Sep 30 15:14
_ IMK1001_001 C0000 2534 1 M Sep 30 14:10 00:13 00:14 00:00 00:00 Sep 30 14:24
```

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- This is the same panel scrolled to the right. Notice the Job Instance id does not scroll
- The fields on the Job Instance panel are explained in the next few slides

### Fields of Interest

- **Job Instance Id** – Job Name + schedule id
- **CP** – is it on the critical (most urgent) path of the application?
- **Slack Time** – used to calculate urgency
- **Job Instance Progress** - # jobs preceding or waiting on this job
- **PI** – Production Importance
- **Status** - Pending, Active, Done, Ready, Failed

Job	App	C	-Urgent	Path-	Job	Inst	P	
--Instance Id--	--Name--	P	Rerun	Slack	Progress	I	-Status-	-----Details-----
_ IAP2001_001	IAP	C	0.3	00:07	1	3	Pending	

### Fields of Interest

#### — Details

- EXECUTING LPARname/Stepname
- AWAITING EXECUTION
- DSN Triggered
- DSN Not Created
- This Job Cancelled (or Skipped)
- Triggering job Cancelled (or Skipped)
- Repeating Job Cancelled (or Skipped)

Job	App	C	-Urgent	Path-	Job	Inst	P	
--Instance Id--	--Name--	P	Rerun	Slack	Progress	I	-Status-	-----Details-----
_ IAP2001_001	IAP	C	0.3	00:07	1	3	Pending	

- If the job is in execution, the Details column shows on which LPAR and in which step
- It also shows when a job has been cancelled or skipped in CA 7 and if its triggering job was cancelled or skipped

### Fields of Interest

#### — CA 7 Status

- FCAST
- REQ-Q
- RDY-S
- ACT-Q
- Cancel
- Cnnnn
- COMP
- Skipped

Job	CA-7	CA-7 # of	H	Exp/Actual	Job-Elapsed	Step-Elapsed	Exp/Actual
--Instance Id--	-Status-	Job#	Paths	T	-Start Time-	-Exp--Actual	-Exp--Actual Ending-Time
IAP2001_001	FCAST	2	M	Sep 30 15:17	00:32	00:00 00:00	Sep 30 15:49

— This is the status according to CA 7

### Fields of Interest

#### — CA 7 Status (Continued)

- R-#nnn – step level condition code fail
- R-Cnnn – job level condition code fail
- A-Snnn – system abend
- A-Unnn – user abend
- R-JCLERR
- Not Run
- N-FAIL/STOP/OFFL/XTRK – for XPJOB
- W-AGENT

Job	CA-7	CA-7 # of	H	Exp/Actual	Job-Elapsed	Step-Elapsed	Exp/Actual
--Instance Id--	-Status-	Job# Paths	T	-Start Time-	-Exp--Actual	-Exp--Actual	Ending-Time
IAP2001_001	FCAST	2	M	Sep 30 15:17	00:32	00:00 00:00	Sep 30 15:49

### Fields of Interest

- CA-7 Job #
- # of Paths
- HTM - Header, Trailer or Middle job
- Expected or Actual Start and Ending Times
- Job Elapsed (and Step Elapsed) Expected and Actual
- Acceptable Time

Job	CA-7	CA-7 # of H	Exp/Actual	Job-Elapsed	Step-Elapsed	Exp/Actual
--Instance Id--	-Status-	Job# Paths T	-Start Time-	-Exp--Actual	-Exp--Actual	Ending-Time
IAP2001_001	FCAST	2 M	Sep 30 15:17	00:32	00:00 00:00	Sep 30 15:49

- Acceptable Time is the time a Job Instance is expected to be completed by, after which it will be considered to be late.

## Dealing with problems

```
----- TM/PCS Services -----
View Active Battle Plan Job Instances

Command ==> Scroll ==> CSR

Cycle Date/Time - From: Sep 30,2011 14:00 To: Oct 01,2011 13:59
Current Date/Time: Sep 30,2011 15:11:21

Line Commands: S-Job Paths P-Detailed Job Paths X-Display Experience
O-View Defaults/Options G-Progress I-Info(TM/UDF) A-Add to R-Remove from

List of All Job Instances in Battle Plan Line 9 of 432
Job Instance Id: I* Repeat: Next Sorted by: Job Inst Progress
Job App C -Urgent Path- Job Inst P
--Instance Id-- --Name-- P Rerun Slack Progress I -Status- -----Details-----
- IAP2001_001 IAP C 0.3 00:07 1 3 Pending
- ISI1001_001 ISI C 0.1 00:02 1 4 Failed A-S106
- IAP05TR1_001 IAP 0 3 Done
- IAP1001_001 IAP C 0.3 00:07 0 3 Active EXECUTING MVSD/STEP2
- IBK2001_001 IBK C 0.5 00:07 0 2 Ready AWAITING EXECUTION
- IBK2002_001 IBK C 0.4 00:06 0 2 Ready AWAITING EXECUTION
- IMK05TR1_001 IMK 0 3 Done
- IMK1END5_001 IMK 0 3 Done Triggering Job Cancelled
- IBK05TR1_001 IBK 0 2 Done
- IBK0001_001 IBK 0 2 Done
- IBK15TR1_001 IBK -0.3 -00:06 C 11 2 Active EXECUTING MVSD/XTRACT
- IMK1001_001 IMK 0 3 Done
```

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- Let's look more closely at this panel.
- This job shows that it failed with a System abend, S106. An operator should know immediately that this is something that requires technical support or programming to resolve, and would therefore initiate a problem ticket and make a call

## Dealing with problems

```
----- TM/PCS Services -----
View Active Battle Plan Job Instances

Command ==> Scroll ==> CSR

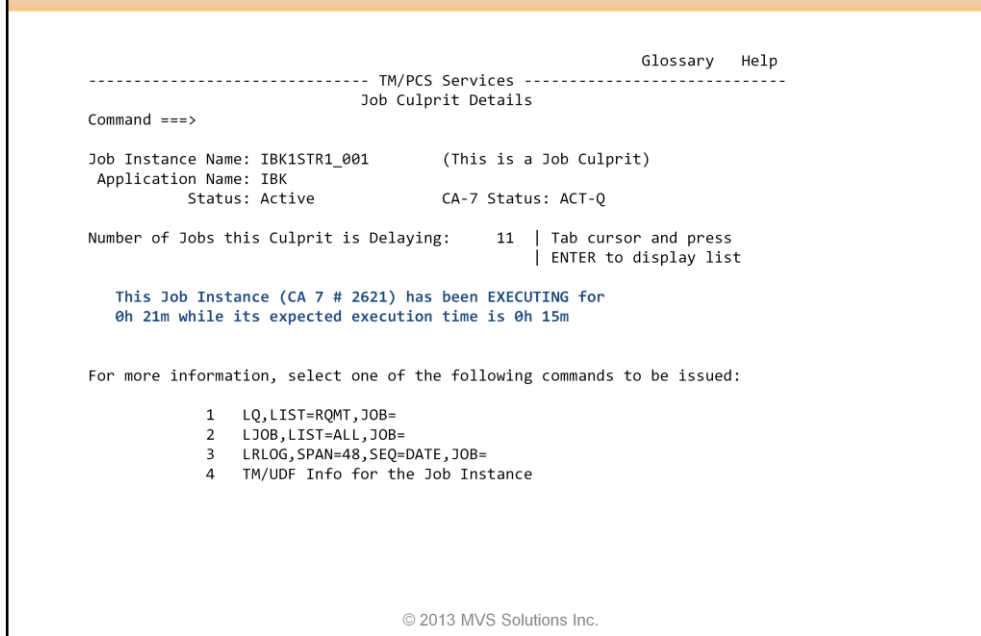
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Job App C -Urgent Path- Job Inst P
--Instance Id-- --Name-- P Rerun Slack Progress I -Status- -----Details-----
- IAP2001_001 IAP C 0.3 00:07 1 3 Pending
- ISI1001_001 ISI C 0.1 00:02 1 4 Failed A-S106
- IAP0STR1_001 IAP 0 3 Done
- IAP1001_001 IAP C 0.3 00:07 0 3 Active EXECUTING MVSD/STEP2
- IBK2001_001 IBK C 0.5 00:07 0 2 Ready AWAITING EXECUTION
- IBK2002_001 IBK C 0.4 00:06 0 2 Ready AWAITING EXECUTION
- IMK0STR1_001 IMK 0 3 Done
- IMK1END5_001 IMK 0 3 Done Triggering Job Cancelled
- IBK0STR1_001 IBK 0 2 Done
- IBK0001_001 IBK 0 2 Done
- G IBK1STR1_001 IBK -0.3 -00:06 C 11 2 Active EXECUTING MVSD/XTRACT
- IMK1001_001 IMK 0 3 Done
```

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- Here's another job with an interesting status.
- It's executing but is late – note the negative values for rerun factor and slack time
- It also shows that there are 11 jobs waiting on this and, by the C under Progress, that it is considered a culprit
- To find out what is happening we put a 'G' for proGress, on the line.



- The Culprit Details panel shows us in this case that the job has been executing for longer than expected
- There are four commands that are often useful at this point, although not in this case, that can be invoked by choosing 1, 2, 3 or 4.
- Even though it's not really helpful in this situation let's try 1 to illustrate what happens



## Dealing with problems

File Edit Edit\_Settings Menu Utilities Compilers Test Help

VIEW

SYS11273T152131RA000RSI01MWR0164272

Columns 00001 00124

Command ==>

Scroll ==> CSR

\*\*\*\*\* \*\*\*\*\* Top of Data \*\*\*\*\*

000001 - 11273 152131 /LOGON \*\*\*\*\*

000002

000003 CA-7023 - r111(SP3 ) OPERATOR IS LOGGED ON TO TERMINAL CCIT1 AT 15:21:31 ON 11273

000004 - 11273 152131 LQ,LIST=RQMT,JOB=2621

000005 1LQ,CA-7#=2621,LIST=RQMT

000006 LIST=RQMT CA-7#2621 DATE=11273 PAGE 0001

000007

000008	JOB	QUEUE	CA-7	-DAY(DDD)	AND	TIME(HHMM)--	CPU	SCH	ENTRY	MSTR	JOB
000009	NAME	NAME	JOB#	DEADLINE	SUB/START	DUE-OUT	SPEC/RUN	ID	MODE	REQ	STATUS

000010

000011

000012 IBK1STR1 ACT 2621 273/1456 273/1450 273/1510 ALL-MVSD 001 SSCN 000 LATE

000013

000014 SLIF-00 REQUEST COMPLETED AT 15:21:31 ON 11273

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- Here is the result of a LQ command issued from the previous panel
- The results are displayed in a Browse window, meaning that it is scrollable up and down – very useful for LJOB,LIST=ALL,...

## Dealing with problems

```
----- TM/PCS Services -----
View Active Battle Plan Job Instances

Command ==> Scroll ==> CSR

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Job App C -Urgent Path- Job Inst P
--Instance Id-- --Name-- P Rerun Slack Progress I -Status- -----Details-----
- IAP2001_001 IAP C 0.3 00:07 1 3 Pending
- ISI1001_001 ISI C 0.1 00:02 1 4 Failed A-S106
- IAP05TR1_001 IAP 0 3 Done
- IAP1001_001 IAP C 0.3 00:07 0 3 Active EXECUTING MVSD/STEP2
- IBK2001_001 IBK C 0.5 00:07 0 2 Ready AWAITING EXECUTION
- IBK2002_001 IBK C 0.4 00:06 0 2 Ready AWAITING EXECUTION
- IMK05TR1_001 IMK 0 3 Done
- IMK1END5_001 IMK 0 3 Done Triggering Job Cancelled
- IBK05TR1_001 IBK 0 2 Done
- IBK0001_001 IBK 0 2 Done
- X IBK15TR1_001 IBK -0.3 -00:06 C 11 2 Active EXECUTING MVSD/XTRACT
- IMK1001_001 IMK 0 3 Done
```

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- Back on the Job Instance display, let's find out how this job usually runs
- By placing an X on the line command area we can see the experience data for this job and schedule id combination and determine how excessive its current run time is

## Dealing with problems

```
----- TM/PCS Services -----
Job Instance Summary - Experience File Information
Command ==> Scroll ==> CSR

Job Instance : IBK1STR1   Sched Id : 001   Application : IBK
Instances Kept: 15       Avg Elapsed: 00:15:12   Avg CPU (Secs): 199
# of Instances: 1755

Average Tape Counts      Average Service Unit Counts
Actual High Water : 0     SRB:      4,519
Analysis High Water: 0    CPU:      15,645
Dynamic Allocations: 0    I/O:      110K

Line Commands: S - Detailed Display of a Job Run

Line 1 of 15
- -Start Date--Time- # of Steps-Elapsed- MAX CC -CPU- --SUS-- --SUS-- --SUS-- I/O - Actual
_ Sep29,2011 15:07:52 6 00:15:09 0000 6.42 4,579 15,770 110K 0
_ Sep28,2011 15:07:19 6 00:15:46 0000 5.03 4,584 15,773 110K 0
_ Sep27,2011 15:08:48 6 00:19:58 0000 4.98 4,351 15,615 109K 0
_ Sep26,2011 15:07:09 6 00:12:35 0000 4.99 4,520 15,720 110K 0
_ Sep25,2011 15:09:06 6 00:17:33 0000 5.03 4,510 15,773 110K 0
_ Sep24,2011 15:09:14 6 00:14:30 0000 4.99 4,457 15,687 110K 0
_ Sep23,2011 15:09:27 6 00:14:34 0000 4.97 4,466 15,712 110K 0
_ Sep22,2011 15:08:14 6 00:18:07 0000 4.92 4,331 15,487 109K 0
_ Aug28,2011 15:07:00 6 00:15:19 0000 6.47 4,803 15,976 111K 0
```

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- The experience data shows that although the job usually runs for around 15 minutes it has recently run as long as 20 minutes, so perhaps 22 minutes is not yet something to worry about
- By the way, this experience data is what PCS uses to calculate the expected path lengths

## What would a AE+ trained operator do?

- Give it a little longer
  - May be looping
  - Program may have changed
  - May be more data than usual
- If it still continues, call the application support people
- The evidence is all there

- So what would a good operator do? Not much for now
- Depending on how important and time-critical this job is, the operator will probably leave it to run for another 5 or 10 minutes before calling anyone
- However, if that call is necessary operations can report the usual runtime, this runtime, and the step the job is in

## Dealing with problems

```
----- TM/PCS Services -----
View Active Battle Plan Job Instances

Command ==> Scroll ==> CSR

Cycle Date/Time - From: Sep 30,2011 14:00 To: Oct 01,2011 13:59
Current Date/Time: Sep 30,2011 15:11:21

Line Commands: S-Job Paths P-Detailed Job Paths X-Display Experience
O-View Defaults/Options G-Progress I-Info(TM/UDF) A-Add to R-Remove from

List of All Job Instances in Battle Plan Line 9 of 432
Job Instance Id: I* Repeat: Next Sorted by: Job Inst Progress
Job App C -Urgent Path- Job Inst P
--Instance Id-- --Name-- P Rerun Slack Progress I -Status- -----Details-----
- IAP2001_001 IAP C 0.3 00:07 1 3 Pending
- ISI1001_001 ISI C 0.1 00:02 1 4 Failed A-S106
- IAP05TR1_001 IAP 0 3 Done
- IAP1001_001 IAP C 0.3 00:07 0 3 Active EXECUTING MVSD/STEP2
- IBK2001_001 IBK C 0.5 00:07 0 2 Ready AWAITING EXECUTION
- IBK2002_001 IBK C 0.4 00:06 0 2 Ready AWAITING EXECUTION
- IMK05TR1_001 IMK 0 3 Done
- IMK1END5_001 IMK 0 3 Done Triggering Job Cancelled
- IBK05TR1_001 IBK 0 2 Done
- IBK0001_001 IBK 0 2 Done
- IBK15TR1_001 IBK -0.3 -00:06 C 11 2 Active EXECUTING MVSD/XTRACT
- IMK1001_001 IMK 0 3 Done
```

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- There is one more job of particular interest on this job instance panel, job IBK2001
- This job shows as Ready and Awaiting Execution
- Why is it not running? It's clearly not a CA 7 situation so the cause is somewhere in the world of z/OS, JES2 and ThruPut Manager. There could be a number of reasons so let's find out by using the I (Info) command

## Dealing with problems

```
----- TM/PCS Services -----
View Active Battle Plan Job Instances

Command ==> Scroll ==> CSR

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List of All Job Instances in Battle Plan Line 9 of 432
Job Instance Id: I* Repeat: Next Sorted by: Job Inst Progress
Job App C -Urgent Path- Job Inst P
--Instance Id-- --Name-- P Rerun Slack Progress I -Status- -----Details-----
- IAP1001_001 IAP C 0.3 00:07 0 3 Active EXECUTING MVSD/STEP2
- IBK2001_001 IBK C 0.5 00:07 0 2 Ready AWAITING EXECUTION
- IBK2002_001
- IMK0STR1_001 SLM PCS Information
- IMK1END5_001 IBK2001 (JOB05059 - SLM DC H ncelled
- IBK0STR1_001 Awaiting Execution
- IBK0001_001 Job was not selected because it is held by ThruPut Manager
- IBK1STR1_001 Job Scheduler : CA 7 RACT
- IMK1001_001 Production Importance : 2
Acceptable ending time : 15:20 on Sep 30, 2011
Expected elapsed time : 00:09 (hh:mm)
Slack time : 00:07 (hh:mm)
Total Delay Time : 00:03
Currently Delayed By : DCS
```

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- Info pops up a window giving you the status as understood by ThruPut Manager.
- It says 'The Job was not selected because it was held by ThruPut Manager'. Why would that be?
- In the top line of that pop-up it shows SLM in green and DC in red.
- SLM stands for Service Level Manager, the automation engine that, under the covers, is getting the jobs selected and run according to the directions of PCS. Since it's green it is not the reason the job is held back
- DC stands for Dataset Contention and is the reason for the Hold
- To find out more, put the cursor on DC and hit Enter

## Dealing with problems

```

----- TM/PCS Services -----
View Active Battle Plan Job Instances

Command ==> Scroll ==> CSR

Cycle Date/Time - From: Sep 30,2011 14:00 To: Oct 01,2011 13:59
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Line Commands: S-Job Paths P-Detailed Job Paths X-Display Experience
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List of All Job Instances in Battle Plan Line 9 of 432
Job Instance Id: I* Repeat: Next Sorted by: Job Inst Progress
Job App C -Urgent Path- Job Inst P
--Instance Id-- --Name-- P Rerun Slack Progress I -Status- -----Details-----
- IAP1001_001 IAP C 0.3 00:07 0 3 Active EXECUTING MVSD/STEP2
- IBK2001_001 IBK C 0.5 00:07 0 2 Ready AWAITING EXECUTION
- IBK2002_001
- IMK0STR1_001 DCS Display EXECUTION
- IMK1END5_001 IBK2001 (JOB05059) SLM DC ng Job Cancelled
- IBK0STR1_001 WAITING FOR 1 DATA SET
- IBK0001_001 RSI01.GDEMO.HOLDDSN NEEDED EXC
- IBK1STR1_001 IBK -0.3 -00:06 C 11 2 Active EXECUTING MVSD/XTRACT
- IMK1001_001 IMK 0 3 Done
  
```

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- Another pop-up appears with Dataset Contention information
- It shows that the job is waiting for one dataset, RSI01.GDEMO.HOLDDSN, and needs it exclusive (DISP=OLD or DISP=MOD)
- The next thing to find out is who or what is holding this dataset. Put the cursor on the dataset and hit Enter

## Dealing with problems

```
----- TM/PCS Services -----
View Active Battle Plan Job Instances

Command ==> Scroll ==> CSR

Cycle Date/Time - From: Sep 30,2011 14:00 To: Oct 01,2011 13:59
Current Date/Time: Sep 30,2011 15:11:21

Line Commands: S-Job Paths P-Detailed Job Paths X-Display Experience
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List of All Job Instances in Battle Plan Line 9 of 432
Job Instance Id: I* Repeat: Next Sorted by: Job Inst Progress
Job App C -Urgent Path- Job Inst P
--Instance Id-- --Name-- P Rerun Slack Progress I -Status- -----Details-----
- IAP1001_001 IAP C 0.3 00:07 0 3 Active EXECUTING MVSD/STEP2
- IBK2001_001 IBK C 0.5 00:07 0 2 Ready AWAITING EXECUTION
- IBK2002_001
- IMK0STR1_001 DCS Display EXECUTION
- IMK1END5_001 IBK2001 (JOB05059) SLM DC Job Cancelled
- IBK0STR1_001 WAITIN Holder Information
- IBK0001_001 RSI0 RSI01.GDEMO.HOLDDSN
- IBK1STR1_001 IBK Held EXC by IBK1001 on system MVSD SD/XTRACT
- IMK1001_001 IMK 0 3 Done
```

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- And here's the answer. The dataset in this case is in use by another batch job, IBK1001, which also has it exclusive

## What would a AE+ trained operator do?

- Probably nothing!
- If the holder is a batch job and not production, could cancel
  - But not if it has an EXC enqueue – could damage the dataset
- If the holder is a TSO user
  - The operator knows the user has been automatically nagged
  - If the user has the dataset SHR, it will be taken back automatically
  - If the user has the dataset EXC and has not freed, then call the user
- Report it to his ThruPut Manager person
  - The dataset fencing feature could be used to avoid this situation

- So what would a good operator do about this job? Nothing, because ThruPut Manager is already doing what needs to be done if it is possible
- In this case the operator – and ThruPut Manager - must simply wait until the holding job releases the dataset
- If the dataset had been held by a TSO user the userid would have been shown
- The TSO user would have received nagging messages stating that the dataset was required by job IBK2001
- If the job was importance level 1 or 2, and the user did not have the dataset open for output or update, the user would have been warned that the dataset would be taken away. If after that the dataset was not freed it would be removed from the TSO session, a technique known as repossession
- Dataset fencing is a feature of ThruPut Manager and PCS intended to prevent a TSO user or a job outside of the schedule from enqueueing a critical dataset and causing this situation unnecessarily

## What can't you see?

Behind the scenes, z/OS and JES2 are being managed to meet the due-out times and importance of the schedule

- If the queues are growing, jobs are moved ahead based on slack time and Production Importance
- If the system is very busy, low importance jobs may be delayed to ensure high importance work gets done
- If you use IBM's soft capping with sub-capacity pricing, batch is managed to keep within your limits
- The Service Class is set appropriate to the Importance and urgency of each job

- Because of its connection to CA 7, PCS knows each job in the context of its application, tree and path and can calculate when it needs to complete and therefore when it needs to start
- It adds some padding – a Target time allowing for a rerun if possible – as well as the Acceptable time, and tells SLM the selection priority, the Production Importance and whether the job is late or on the most urgent path for the application
- SLM uses that information to manage the job in its PCS queue, move it as quickly as need be to meet its selection goal, prioritize the preparation and set the Service Class
- SLM is cognizant of soft capping and, with its capacity management capability, will slow down selection of batch according to your directions. For example, you might stop selecting your lowest importance batch when at 90% of your desired cap, stop selecting the next level at 92% and so on

## An SDSF view

```

SDSF DA MVSD      MVSD      PAG 0 CPU/L 23/***      LINE 11-44 (62)
COMMAND INPUT ==>
NP  JOBNAME StepName ProcStep JobID   Owner   C Pos DP SrvClass
CA730NL CA730NL CA73   STC00997 CA730NL  NS  F6 STC
CEA      CEA      IEFPROC                NS  FF SYSTEM
CONSOLE  CONSOLE                NS  FF SYSTEM
DEVMAN   DEVMAN  IEFPROC                NS  FF SYSTEM
DLF      DLF      DLF                NS  FE SYSSTC
DUMPSRV  DUMPSRV DUMPSRV                NS  FF SYSTEM
FTPD1    STEP1    STC24498 FTPD                LO  FF SYSOTHER
GRS      GRS                NS  FF SYSTEM
HSC      HSC      HSC      STC12996 HSC                LO  FF STC
IAP1001  XTRACT2    JOB05015 CA730NL 1 IN  F0 SLMMED
IBK1001  UPDATE      JOB05016 CA730NL 1 IN  FF SLMVHI
IBK3002  SORT1      JOB05019 CA730NL 1 IN  F0 SLMHIGH
IMK1END5 XTRACT      JOB05009 CA730NL 1 IN  F0 SLMMED
IMK1004  XTRACT2    JOB05013 CA730NL 1 IN  F0 SLMMED
IMK3002  STEP6      JOB05027 CA730NL 1 LO  F0 SLMHIGH
IOSAS    IOSAS    IEFPROC                NS  FF SYSTEM
ISI0STR1 PREP95     JOB05005 CA730NL 2 IN  EC SLMLOW
IXGLOGR  IXGLOGR  IEFPROC                NS  FF SYSTEM
JESXCF   JESXCF  IEFPROC                NS  FF SYSTEM
JES2     JES2   IEFPROC                NS  FE SYSSTC

```

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- The SDSF DA panel shows the current Service Class in use by each executing job.
- This display shows that job IBK3002, a job from the same application and with the same Production importance, is running in a Service Class called SLMHIGH, whereas our late job, IBK1001, is running in Service Class SLMVHI (very high), as set by SLM

- AE+ and CA Workload Automation CA 7 Edition together are an unbeatable combination
- Operations have a consolidated view of their schedule
- Few, if any, actions need to be taken
- Operators can focus on the applications

- PCS provides intelligent use of your system resources to meet the goals of your schedule
- It automatically adjusts the selection priority and Service Class for a job based on progress of the schedule
- It removes your dependence on the knowledge of a very few veteran operators
- PCS has been part of an Early Availability program and is now generally available.
- One large company has been managing all their production under PCS control since July of 2011
- Another managed all the work in their development CA 7 and used Monitor mode (all the panels, messages, alerts and so on but without actually managing the work) in production during the BETA phase but now are using PCS to manage almost all their production as well.