



DB2's Awkward Relationship with Batch

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Bio

Not a DB2 guy



Joined Compuware in February 2018 as a Field Technical Support representative.

Previously, 38 years in mainframe systems programming, performance and capacity management and data center management.

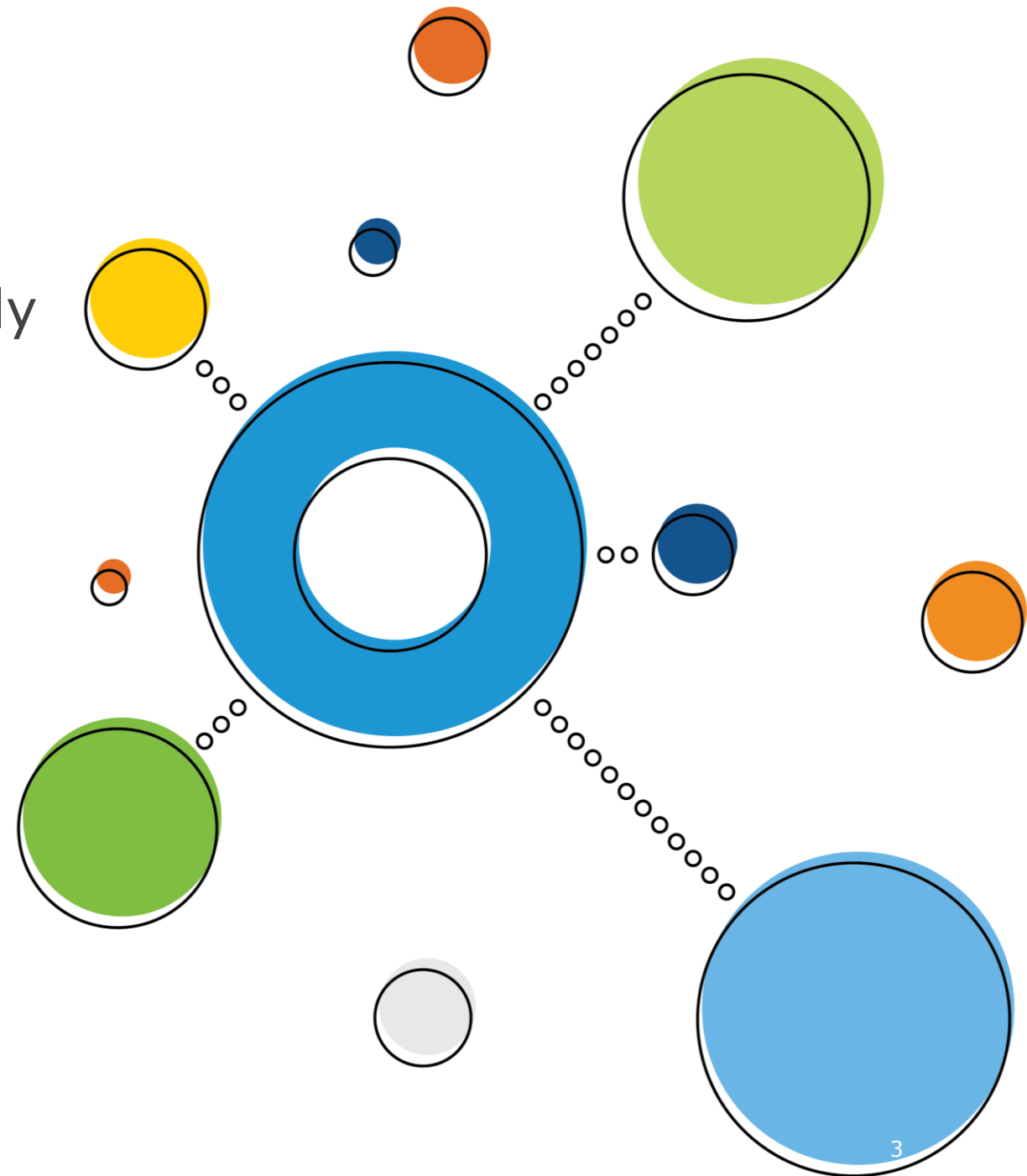
24 years of ThruPut Manager experience.

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Don't hurt me

Agenda

- Getting Jobs to DB2 – Appropriately
- Bad Time to Run That job!
- Too Many Jobs at Once
- DB2 and Rolling IPLs
- Maintaining DB2
- Can't Start DB2?!



Getting Jobs to DB2 – Appropriately

- Not all database regions are data shared
- Database regions are moved around for various reasons
- Jobs must run on the LPAR where the required database is running
 - You ever experience any scheduling glitches?
- **How to route jobs WHERE and WHEN the DB2 is running?**
- NOT! when... DB2 is simply started... but when DB2 is ready for work
- NOT! When... DB2 is on its way down

Bind the Job to the DB2 Region It Requires

Identify which database is needed from DD statement

```
$DDREF DB2_P4 DDNAME(STEPLIB) DSN(DB2.DBP4.DSNLOAD)  
$DDREF CV56 DDNAME(SYSCTL) DSN(IDMS.PROD.SYS56.SYSCTL)
```

Add a Job Binding Agent to the job

```
IF (DB2_P4)
```

```
    JBS ADD BIND(DBP4)
```

```
ENDIF
```

```
IF (CV56)
```

```
    JBS ADD BIND(IDMS.CV56)
```

```
ENDIF
```

Works for IDMS and
any other job-related
service, too...



Bind the Job to the DB2 Region It Requires



- What if no JCL statement indicates DB2 usage?
- Code a JECL statement in the job:

```
//*+JBS BIND DBP4
```

- This may be preferred as it makes DB2 usage evident in the JCL without searching
- Jobs may have multiple binding agents
- TM will find the LPAR(s) that meet all the criteria

Let DB2 Manage the **Bind**

- Now that the job has a BIND to an DB2 region...
- The database must turn up the BIND so TM can connect the job to it

Add ThruPut Manager JECL statements to the database STC JCL

```
//*+JBS MESSAGE *'DSN9022I'*""START DB2""*,API=01
```

```
//*+JBS ACTIVATE DBP4,API=01,LOCAL
```

```
//*
```

```
//*+JBS MESSAGE *'DSNY002I'**,API=02
```

```
//*+JBS DEACTIVATE DBP4,API=02
```

Jobs bound to DB2 still start when DB2 is ready for work...



Getting Jobs to Multiple DB2 Regions

- What if you use DB2 data sharing?
 - Jobs can run on multiple LPARs against multiple DB2s...

```
//*+JBS BIND DBP3A,DBP3B,DBP3C
```

- Job can run wherever any of these regions are active
- TM SLM will balance jobs across LPARs

Or you can use JAL to add a Job Binding Agent to the job

```
IF (DB2_P3)
```

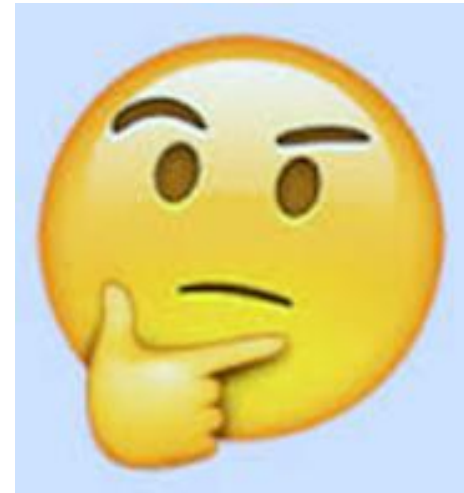
```
  JBS ADD BIND(DBP3A,DBP3B,DBP3C)
```

```
ENDIF
```



Controlling Access to Resources

- Sometimes you want to do things when a resource is **NOT** available
- Like when a CICS region is not running
- Note: up is down and down is up... you'll see what I mean



Add ThruPut Manager JECL statements to the CICS STC JCL

When CICS starts, end the "down" state

```
//*+JBS DEACTIVATE CICS.AOR1DOWN AT=$JOB.INIT
```

When CICS stops, start the "down" state

```
//*+JBS ACTIVATE CICS.AOR1DOWN AT=$JOB.TERM
```

Works for DB2 and any other subsystem or service

Bad Time to Run That Job

- Application has programs with a poor commit rate
 - Running those jobs against online regions causes response time problems
- Job normally runs when CICS regions are down
 - Some batch delay maneuvers job execution into online window
- **What to do?**
 - Don't allow jobs containing these programs to execute at the wrong time!



Bad Time to Run That Job

Identify jobs and add Job Binding Agent:

```
EVAL DATA_WAREHOUSE_JOB $PROGRAM(DW24*) LIB(PROD.DW.LINKLIB)
IF (DATA_WAREHOUSE_JOB)
  JBS ADD BIND(DBP5.DW)
ENDIF
```

Or:

```
//*+JBS BIND DBP5.DW
```

Use system automation to control when DBP5.DW binding agent is active:

```
/|JBS ACTIVATE DBP5.DW
/|JBS DEACTIVATE DBP5.DW
```

Too Many Jobs at Once

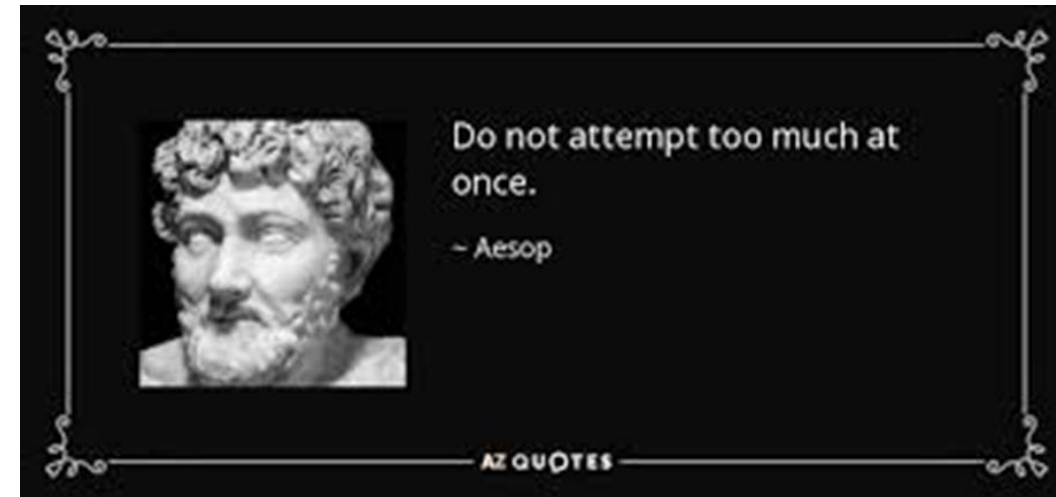
- Need to control concurrent batch access to DB2 objects at times

Define a Job Limiting Agent in JAL for DB2 jobs using PRODMASTER object

```
JLS_LIMITDEF DB2_THREADS LEVEL1('DBP7DB')  
                    LEVEL2('PRODMASTER')  
                    LIMIT(25)
```

Dynamically creates a limiting agent

DBP7DB.PRODMASTER



By default up to 25 concurrent jobs using this resource will run concurrently... **BUT**

Too Many Jobs at Once

- It's month end!
- We need speed!!
- Control concurrent access to this object

Enter an operator command to override the default value

```
/|JLS SET DBP7DB.PRODMASTER LIMIT(5)
```

Installation complete, return to normal setting (25)

```
/|JLS RESET DBP7DB.PRODMASTER
```

Or allow unlimited usage

```
/|JLS SET DBP7DB.PRODMASTER LIMIT(999)
```



DB2 and Rolling IPLs

- Since you have a binding agent on every job
 - Specifying which DB2 region/s each job needs...
 - You now have the control you need

/|JBS DISPLAY AGENT agent-name



| JBS D AGENT DBZ2

DTM6420I JBS BINDING DISPLAY

DBZ2 - STATUS=(ACTIVE,RESERVED) LOG

SCOPE=(JOB,UNIQUE)

ACTIVE ON SYSP,SYSZ,S001,D411

RESERVED ON ALL

LAST ACTION:SEP 22, 2019 03:31 BY DBZ2MSTR(S0072068)

ACTIVATED ON SYSP

NOTE=(PROD. DB2 REGION DBZ2)

J0117081 BOC0003Z AWAITING EXEC SYS=SYSP,SYSZ,S001,D411

J0180547 TMT9999B AWAITING EXEC SYS=SYSP,SYSZ,S001,D411

J0020616 QB4275 EXECUTING SYS=SYSZ

J0020631 JSR9081C EXECUTING SYS=S001

J0020636 XE0245 EXECUTING SYS=D411

DB2 and Rolling IPLs

Use your system automation

- While batch is draining, system automation monitors active DB2 batch jobs
- When all jobs complete for a given DB2 region, it is ready for shutdown
 - Initiate your shutdown
- DB2 shutdown will deactivate the binding agent
 - No jobs will start post IPL until DB2 JBS JECL turns up the bind



Maintaining DB2 w/o Unintended Batch Consequences

- Using Job Limiting Agents... You can serialize access to your DB2 when needed

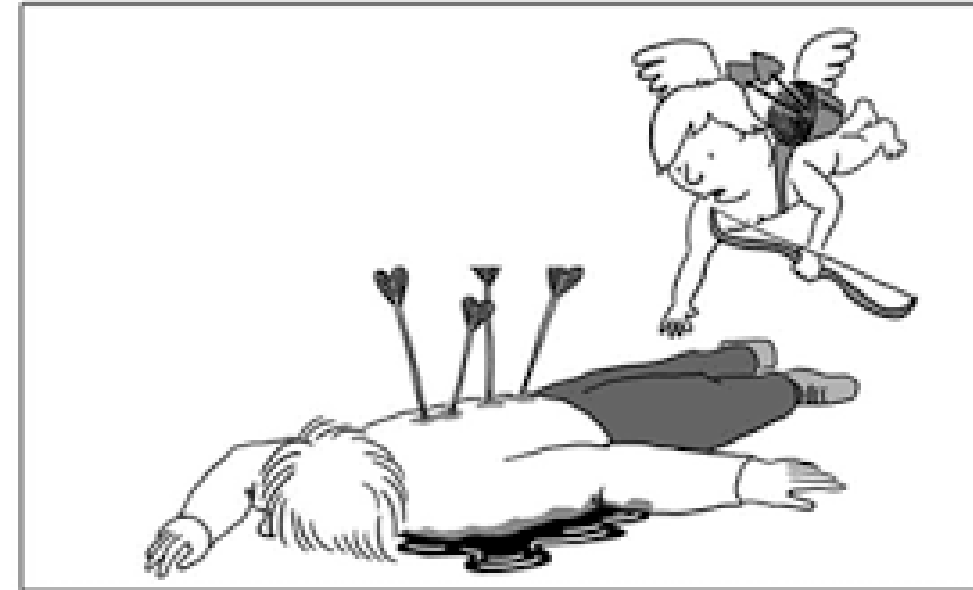
```
JLS_LIMITDEF DB2_xxx LEVEL1('DBP8') LIMIT(999)
```

Dynamically creates a limiting agent **DBP8**

Code this in your special job

```
//*+JLS ENQ DBP8,EXCLUSIVE,DRAIN
```

- Draining begins when this job is initiated
- Prohibits job selection of subsequent jobs using this agent



...Hello? Gary?

- When your job executes, you will be the only batch job running against this DB2

Can't Start DB2

- Some job or TSO user has a DB2 dataset allocated... DB2 STC cannot start!!!

What to do?

- Send an **Alert!** Make people aware... enable a decision what to do...
- **Nag** a TSO user!!



DCS Alert Service

- DCS provides the ability to issue Alerts when dataset contention persists
 - Alert destination and delay time defaults are established in TMSS parms
- Alerts may be sent to a group or person responsible for the resolving the delay
- DCS Alerts for STCs may be customized by JECL statements
 - Alerting may be customized at the dataset level

DCS Alert Service

DATASET CONTENTION SERVICES ALERT FEB 10, 2018
13:35

!!!DB2 STARTUP STALLED!!!

*** YOUR OWN HEADER2***

STC10127 DBP2xxxx NODE CENTRAL

CONTENTION: ON SYS3 FEB 10, 2018 13:15

STATUS: WAITING IN INITIATOR

DSN: DB2.DBP4.DSNLOAD G/EXC/CLAIM

HELD BY: USR932 TSU SYS2 SHR

YOUROWN FOOTER1

YOUROWNFOOTER2

Alert When Startup Delayed for SYSDSN Contention

```
//*+DCS ALERT TIME=0,DEST=ALERTCON
```

- Alert immediately if STC startup is delayed

```
//*+DCS ALERTHn 'hard coded text'
```

```
//*+DCS ALERTFn 'hard coded text'
```

- Customize the alert

Dataset Contention **Nagging** of TSO Users

- Used to inform (*nag*) TSO users they are holding a dataset needed by your DB2s

DTM7108I PLEASE FREE DATASET *dataset-name* *time*

DTM7109I THIS DATASET IS REQUIRED BY STC10283 DBP2xxxx

Dude! DB2 won't start because of you!!

The CIO's office is requesting an explanation!!!

- Message content customizable
 - Perhaps include phone number to call
- We can also automatically deallocate the dataset if unopened or opened for input



\$D M J Command Extension



- IBM JES2 command to send a message to a job
 - Message inserted into JOBLOG JESMSGLOG spool data set
 - Job must be in execution
- Compuware has extended this command to work before, during and after job execution
- **Why is this important?**

\$D M J Command Extension

- The JOBLOG should contain all console activity concerning a job
 - Improved audit capabilities
 - Reduce need for SYSLOG research
- Annotate all manual operator actions in the job
 - Use your system automation to insert any commands issued into JOBLOG
 - Message should include Date/Time and Operator ID
- Suggested commands:

\$AJ Held Release job(s)

\$CJ Cancel job

\$EJ Restart job

\$HJ Hold job(s)

\$OJ Release or cancel held output

\$SJ Start job

\$TJ Change job

Others subsystems/products

\$D M J Command Extension

- Consider writing a Job Cancellation dialog
 - Require cancellation reason, ticket number
 - **Ensure correct dump is taken**, if needed
 - Kick off a Strobe measurement before cancellation
- **Watch DB2 JOBLOGs for job-related activity**
 - **Some message activity only found in DB2 address spaces**
 - **DB2 deadlocks, locking, SQL error codes**
- User demographics
 - Extract name and phone number from security product
 - Insert into JOBLOG for Operator convenience



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