IMQ09 - IBM MQ V9 for z/OS Wildfire Workshop

# L03 – Advantages of Having Enough Fixed Pages

*Version V6.0*

*October 2018*

# Table of Contents

# Lab Objectives

This lab is to illustrate the benefits of having sufficient buffer pages in processing workloads.

In the earlier buffer pool exercise we saw that there was fairly low costs associated with bufferpools above the bar, here we hope to show how much benefit there can be.

Information required to complete this exercise will be provided on a 'worksheet' prior to the start of this exercise. Refer to this worksheet for which user identity and password are to be used and for other values, for example:

- ✓ This exercise requires using TSO user *USER1* on the *wg31.washington.ibm.com* system
- ✓ As a reminder, if a value from your worksheet should be used, the values in the instructions will be in red rather than black.
- ✓ ***Bold italicized*** text indicates values that need to be entered on a screen.
- ✓ *Italicized* text indicates values that are constants or names that appear on a screen.
- ✓ **Bold** text indicates the name of buttons or keyboard keys that need to be pressed.

- Please note that you should use the JCL data set USER1.ABBP.JCL for this exercise.

## Running and evaluating the tests

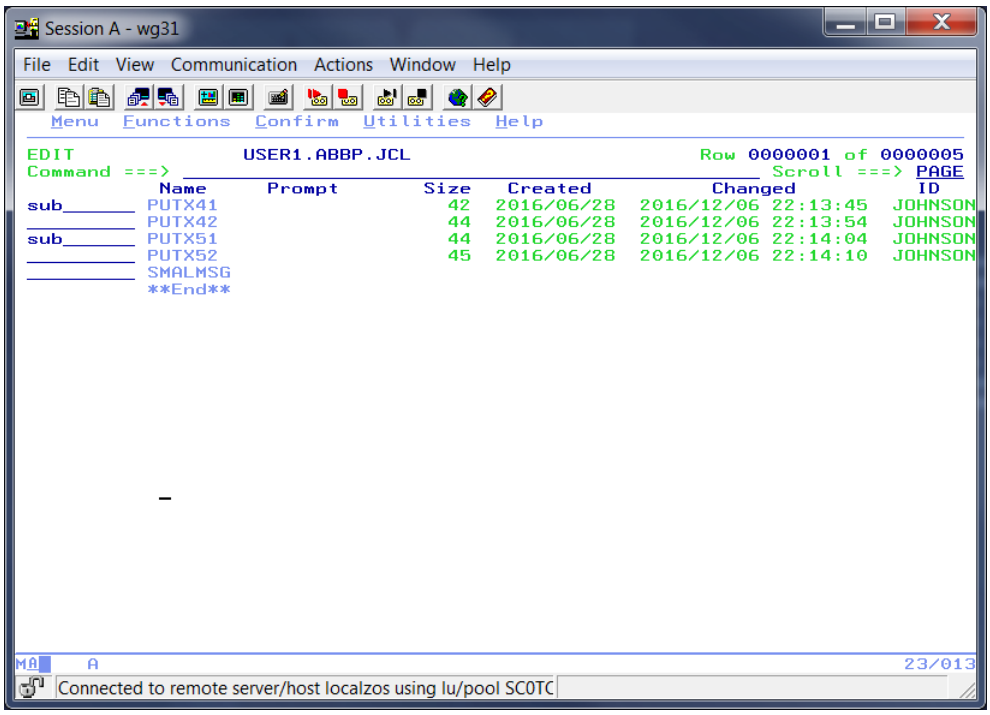
You should use the JCL data set USER1.ABBP.JCL for this exercise. Only 2 of the members will be used for your tests. The queues being used by the PUTX41 and PUTX42 jobs were defined using below the bar buffer pools with 20,000 pages. The queues being used by PUTX51 and PUTX52 defined using above the bar, page fixed buffer pools with 100,000 pages.

____1. You will be running PUTX41 and PUTX51 *or* PUTX42 and PUTX52; you **do not** need to run both sets.

____2. Each test puts 22,000 non-persistent 3K messages to the queue in the first step and retrieves 22,000 messages in the second step. OEMPUTX, a program supplied by the development lab give us a rough idea of the CPU used and the throughput achieved during the test.

While currently unavailable, the lab has committed to providing this program in a future SupportPac, perhaps as part of MP1B. If you would like a copy, please let the instructors know and we can get it to you.

____3. Beside the name of each members of the pair you have selected, enter ***sub*** as shown, and press the **Enter** key:

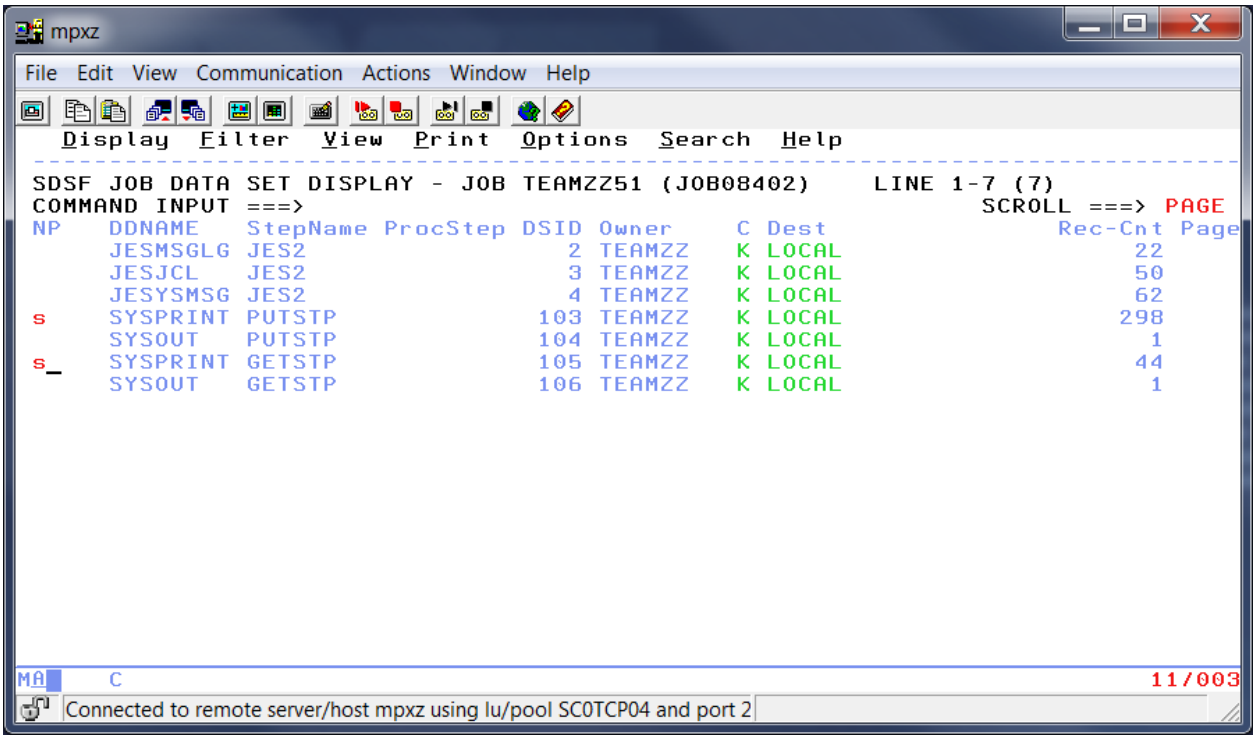



____4. You should see the two jobs submitted.

```
IKJ56250I JOB USER141(JOB03117) SUBMITTED
IKJ56250I JOB USER151(JOB03118) SUBMITTED
***
```

____5. Keep pressing **Enter** and evautually you should see MAXCC condition codes of 0 for both job.

____6. Navigate to SDSF using the command ***=D.H*** (SDSF held output queue) to review the output from the tests and then use a '***?***' in the *NP* (non proteced) column to expand the output file list from the jobstream of the '41' or '51' job. Select the two SYSPRINT files to get the information about the below the bar put and get.




____7. Please capture the following information for comparison from the MQPUT process:

```
-------------------------------------------------------
Total Transactions  : 22000
Elapsed Time        :   64.224 seconds
Application CPU Time:   39.135 seconds  (60.9%)
Transaction Rate    :  342.549 trans/sec
-------------------------------------------------------
Round trip per msg  :     2919 microseconds
Avg App CPU per msg :     1778 microseconds
-------------------------------------------------------
 Jobname.ASID  TCB(uS)  SRB(uS) Tot(uS) (%)
               /tran    /tran   /tran
------------ -------- -------- -------- ----
QMZ1MSTR.003A 00000243 00001304 00001547 53.0
QMZ1CHIN.004B 00000004 00000000 00000005 0.2
QMZ1BRK*      00000000 00000000 00000000 0.0
Total CPUmicrosecs/tran             1553
-------------------------------------------------------
```

a. Total transactions _____
b. Elapsed time: _____
c. Application CPU _____
d. Round Trip per message _____

e. Average CPU per message _____

____8. Please capture the following information from the MQGET process:

```
-------------------------------------------------------
Total Transactions  : 22000
Elapsed Time        :   57.580 seconds
Application CPU Time:   35.139 seconds  (61.0%)
Transaction Rate    :  382.077 trans/sec
-------------------------------------------------------
Round trip per msg  :     2617 microseconds
Avg App CPU per msg :     1597 microseconds
-------------------------------------------------------
 Jobname.ASID  TCB(uS)  SRB(uS) Tot(uS) (%)
               /tran    /tran   /tran
------------ -------- -------- -------- ----
QMZ1MSTR.003A 00000059 00000858 00000918 35.1
QMZ1CHIN.004B 00000004 00000000 00000004 0.2
QMZ1BRK*      00000000 00000000 00000000 0.0
Total CPUmicrosecs/tran             923
-------------------------------------------------------
```

a. Total transactions _____
b. Elapsed time: _____
c. Application CPU _____
d. Round Trip per message _____
e. Average CPU per message _____

____9. Use a '**?**' to expand the output file list from the jobstream of the '51' or '52' job. Select the two SYSPRINT files to get the information about the below the bar put and get.

____10. Please capture the following information for comparison from the MQPUT process:

```
-----------------------------------------------------
Total Transactions  : 22000
Elapsed Time        :   65.873 seconds
Application CPU Time:   39.536 seconds  (60.0%)
Transaction Rate    :  333.976 trans/sec
-----------------------------------------------------
Round trip per msg  :     2994 microseconds
Avg App CPU per msg :     1797 microseconds
-----------------------------------------------------
 Jobname.ASID  TCB(uS)  SRB(uS) Tot(uS) (%)
               /tran    /tran   /tran
------------- -------- -------- -------- ----
QMZ1MSTR.003A 00000254 00001313 00001568 52.4
QMZ1CHIN.004B 00000005 00000000 00000005 0.2
QMZ1BRK*      00000000 00000000 00000000 0.0
Total CPUmicrosecs/tran             1573
-----------------------------------------------------
```

a. Total transactions _____
b. Elapsed time: _____
c. Application CPU _____
d. Round Trip per message _____
e. Average CPU per message _____

____11. Please capture the following information from the MQGET process:

```
-----------------------------------------------------
Total Transactions  : 22000
Elapsed Time        :   43.746 seconds
Application CPU Time:   30.350 seconds  (69.4%)
Transaction Rate    :  502.898 trans/sec
-----------------------------------------------------
Round trip per msg  :     1988 microseconds
Avg App CPU per msg :     1379 microseconds
-----------------------------------------------------
 Jobname.ASID  TCB(uS)  SRB(uS) Tot(uS) (%)
               /tran    /tran   /tran
------------- -------- -------- -------- ----
QMZ1MSTR.003A 00000048 00000736 00000785 39.5
QMZ1CHIN.004B 00000003 00000000 00000004 0.2
QMZ1BRK*      00000000 00000000 00000000 0.0
Total CPUmicrosecs/tran             790
-----------------------------------------------------
```

a. Total transactions _____
b. Elapsed time: _____
c. Application CPU _____
d. Round Trip per message _____
e. Average CPU per message _____

## *Comparing Test Results*

1) Compare the CPU time in seconds for the MQPUTs for the below and above the bar work:
    a. Below total CPU MQPUT: ___ 39.135 (example) _____
    b. Above total CPU MQPUT: ___ 39.536 (example) _____
2) Compare the Elapsed time for the MQPUTs:
    a. Below total Elapsed Time: ___ 64.224 (example) _____
    b. Above total Elapsed Time: ___ 65.873 (example) _____
3) Compare the average CPU time for the MQPUTs for the below and above the bar work:
    a. Below average CPU: _____ 1778 microseconds (example) _____
    b. Above average CPU: ____ 1797 microseconds (example) _____
4) Compare the CPU time in seconds for the MQGETs for the below and above the bar work:
    a. Below total CPU MQGET: ___ 35.139 (example) _____
    b. Above total CPU MQGET: ___ 30.350 (example) _____
5) Compare the Elapsed time for the MQGETs:
    a. Below total Elapsed Time: ___ 57.580 (example) _____
    b. Above total Elapsed Time: ___ 43,746 (example) _____
6) Compare the average CPU time for the MQGETs for the below and above the bar work:
    a. Below average CPU: _____ 1597 microseconds (example) _____
    b. Above average CPU: ____ 1379 microseconds (example) _____

## *Conclusion*

As you can see both the elapsed time and CPU usage are significantly lower on the MQGET process. This is due to I/O – reading messages back from the page set into the buffer pool on message retrieval. The below the bar buffer pool was not going into significant stress, so the MQPUT process did have CPU or elapsed time differences because the page set writes did not have to be done synchronously. If the writes had been done synchronously, there would have been more differences on elapsed time and CPU on the MQPUTs.