How to Compress LARGE Files (Greater Than 4GB) on IBM i for IBM i and Non-IBM i Systems

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You will need these commands…

```
ADDENVVAR ENVVAR(JAVA_HOME) REPLACE(*YES)
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk80/64bit')
LEVEL(*JOB)

cd '/home/user1'

QSH CMD('jar cfM CUSTITEMPR.ZIP  CUSTITEMPR.TXT')
```

Scenario:

- Customer/item pricing data file
- Produced daily after Midnight in Knoxville
- Ready to cross the WAN to GR by 3am

```
wrklnk '/home/user1/CUSTITEMPR.TXT'
Size of object data in bytes . . . . . :   29,582,702,600
```

- Estimated transmission time: 4.5 hours.
- Order receiving system distributes the data to handheld order taking devices that work off-line through the day.
- Devices are synced starting at 6am.
- The data won't be there until 7:30am :(

Object Compression for i

```
CRTSAVF FILE(QGPL/SAVEFILE)

Object       Type      Attribute                  Size
CSITTESTPR   *FILE     PF                12,303,405,056

SAVOBJ OBJ(CSITTESTPR) LIB(QGPL) DEV(*SAVF) OBJTYPE(*FILE)
SAVF(QGPL/SAVEFILE) DTACPR(???)
```

DTACPR(???)	Run Time	CPU	Savefile Size	Comp
*NONE	2 Min	.011	12,306,644,992	0%
*LOW	2 Min	.011	9,481,269,248	23%
*MEDIUM	6 Min	.010	2,601,541,632	79%
*HIGH	29 Min	.013	2,292,277,248	81%

On the target IBM i…

Create the *SAVF before attempting the transfer

```
CRTSAVF FILE(QGPL/SAVEFILE)
```

Transfer the file to the target system…

```
FTP 192.168.1.1
user
pass
bin
get SAVEFILE (replace
quit
```

Restore the object from the *SAVF

```
RSTOBJ OBJ(CSITTESTPR) LIB(QGPL) DEV(*SAVF) OBJTYPE(*FILE)
SAVF(QGPL/SAVEFILE)
```

Not i ... Zip

API QZIPUTIL

QZIPUTIL APIs implemented beginning in V7.1 via PTF.

This article describes how to create command CTZIP.

Using QZIPUTIL APIs - Published by: Bob Cozzi on 16 Jul 2013
http://www.midrangenews.com/view?id=2101

Testing CTZIP using miscellaneous text files showed that it provided the speed and compression that was needed.

```
Then the full customer-item-price file was fed into the process.
CTZIP OBJ(*STMF) STMF('/home/user1/CUSTITEMPR.TXT') SUBDIR(*NO)
           ZIP(DOCUMENT.ZIP) VERBOSE(*YES)
    COMPRESSION FAILED. ONE OF THE FILES TO BE COMPRESSED
      /home/user1/CUSTITEMPR.TXT IS GREATER THAN 4GB IN SIZE.
    Function check. CPF9898 unmonitored by CTZIP at statement
0000012800,
      instruction X'0000'.
    The call to QzipZip ended in error (C G D F).
```

:(

jar ... Java Archive File

Jar (more correctly... jar)
is a java program (class) that allows you to
- Execute a compressed program
- Compress and decompress data files

IBM i. . .
- has a Java virtual machine
Command ADDENVVAR selects the machine version

- can run Java programs as a client
Commands QSH, STRQSH, or CALL QP2TERM will start clients that can run Java.

Java figured out how to operate beyond the 32 bit / 4GB in 2009.

ZIP64, The Format for > 4G Zipfile, Is Now Supported
https://blogs.oracle.com/xuemingshen/entry/zip64_support_for_4g_zipfile
An implementation may optionally support the ZIP64(tm) format extensions defined by the PKWARE ZIP File Format Specification. The ZIP64(tm) format extensions are used to overcome the size limitations of the original ZIP format.

It's up to the java implementation whether it supports Zip64...

Oracle JDKs support it after release (1.7.0 b55).

Zipping with jar

Zip and Unzip files on IBM i

http://www.mysamplecode.com/2012/08/iseries-zip-unzip-files.html

Zip files (archive files) are easy to create using the QSHELL jar command.

Syntax for the Command

jar {ctxu}[vfm0Mi] [jar-file] [manifest-file] [-C dir] files ...

Options:

-c create new archive
-t list table of contents for archive
-x extract named (or all) files from archive
-u update existing archive
-v generate verbose output on standard output
-f specify archive file name
-m include manifest information from specified manifest file
-0 store only; use no ZIP compression
-M do not create a manifest file for the entries
-i generate index information for the specified jar files
-C change to the specified directory and include the following file

Getting the right version of Java

```
  QSH
  $
> java -version
  java version "1.6.0"
  $
> exit
```

IBM 7.1 Default Java = 1.6

1.6 < 1.7.0 b55 :(

Licensed Program Products

GO LICPGM Work with Licensed Programs

Select one of the following:

10. Display installed licensed programs
11. Install licensed programs

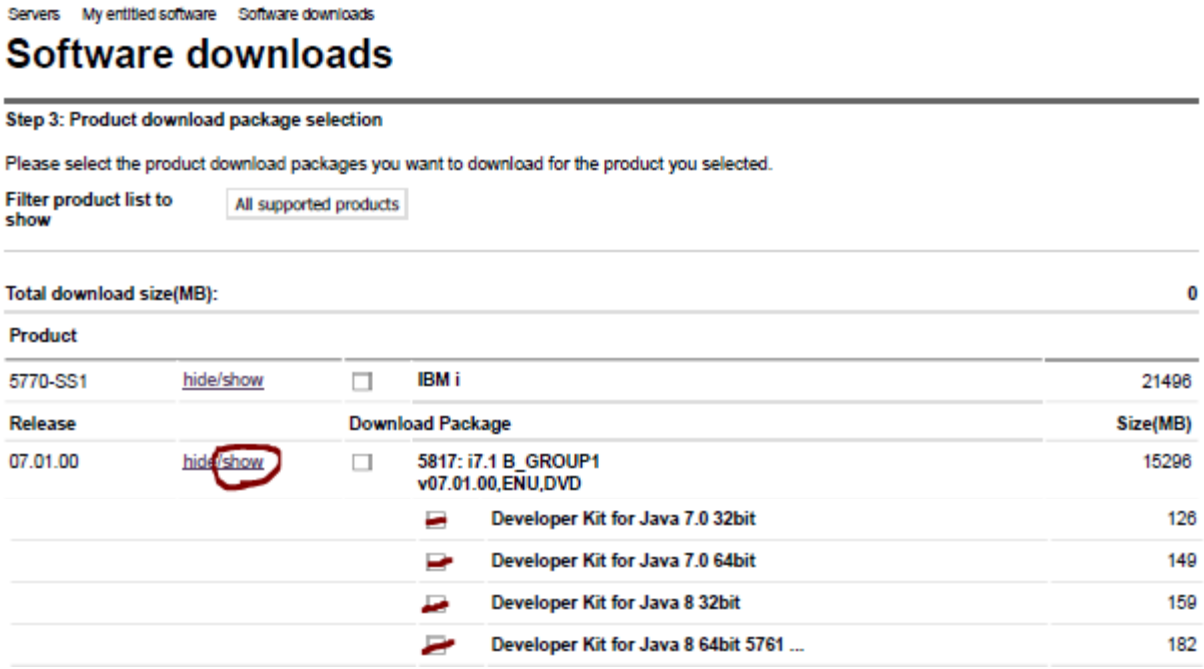
Licensed Program	Product Option	Description
5770SS1	13	System Openness Includes
5770SS1	30	Qshell
5770SS1	33	Portable App Solutions Environment
5761JV1	14	Java SE 7 32 bit
5761JV1	15	Java SE 7 64 bit
5761JV1	16	Java SE 8 32 bit
5761JV1	17	Java SE 8 64 bit

Install then reapply your current cumulative PTF package.

My Entitled Systems Support

My Entitled Software

www.ibm.com/eserver/ess



- Download and Unzip to get .iso files to a local directory

Details: Download Director

State	Date	Size	Name
DONE (packed)	01/27/16 02:01 PM	132,474,107	LCD8_1887_01_Developer_Kit_for_Java_7.0_32bit.iso.ZIP
DONE (packed)	01/27/16 02:01 PM	157,249,729	LCD8_1888_01_Developer_Kit_for_Java_7.0_64bit.iso.ZIP
DONE (packed)	01/27/16 02:02 PM	167,370,161	Developer_Kit_for_Java_8_32bit_5761_JV1_LCD8_2271_00.iso.ZIP
DONE (packed)	01/27/16 02:03 PM	191,737,120	Developer_Kit_for_Java_8_64bit_5761_JV1_LCD8_2272_00.iso.ZIP

- Upload the .iso files to a directory on IBM i

```
ftp 192.168.1.1
user
pass
quote site namefmt 1
cd JV11417
lcd C:\Downloads\V7R1JavaOpts14151617
bin
mput *.iso
quit
```

Put the .iso files into an image catalog

For information about how to use image catalogs...
Google: Install fixes from an image catalog

```
md '/ptf/JV11417'
crtimgclg imgclg(JV11417) dir('/ptf/JV11417') crtdir(*no)
cd '/ptf/JV11417'
call qcmd
ADDIMGCLGE IMGCLG(JV11417) FROMFILE(LCD8_1887_01_Developer_Kit_for_Java_7.0_32bit.iso)
TOFILE(*FROMFILE) TEXT('JDK 7.0 32bit')
```

```
ADDIMGCLGE IMGCLG(JV11417) FROMFILE(LCD8_1888_01_Developer_Kit_for_Java_7.0_64bit.iso)
TOFILE(*FROMFILE) TEXT('JDK 7.0 64bit')
ADDIMGCLGE IMGCLG(JV11417)
FROMFILE(Developer_Kit_for_Java_8_32bit_5761_JV1_LCD8_2271_00.iso)
TOFILE(*FROMFILE) TEXT('JDK 8.0 32bit')
ADDIMGCLGE IMGCLG(JV11417)
FROMFILE(Developer_Kit_for_Java_8_64bit_5761_JV1_LCD8_2272_00.iso)
TOFILE(*FROMFILE) TEXT('JDK 8.0 64bit')

wrkcfgsts *dev optvrt01
wrkimgclg jv11417
Image catalog JV11417, type *OTHER verified.
```

- Restore Licensed Programs

```
RSTLICPGM LICPGM(5761JV1) DEV(OPTVRT01) OPTION(14) ENDOPT(*UNLOAD)
RSTLICPGM LICPGM(5761JV1) DEV(OPTVRT01) OPTION(15) ENDOPT(*UNLOAD)
RSTLICPGM LICPGM(5761JV1) DEV(OPTVRT01) OPTION(16) ENDOPT(*UNLOAD)
RSTLICPGM LICPGM(5761JV1) DEV(OPTVRT01) OPTION(17) ENDOPT(*UNLOAD)
```

- Then load and apply the latest Java PTF group

PTF Group	**Text**
SF99572	**JAVA**

For information about how to use image catalogs...
Google: Install fixes from an image catalog

Default Java Version

How to determine what Java Development Kits (JDKs) are installed and use them in your environment?
http://www-01.ibm.com/support/docview.wss?uid=nas8N1019917

Defaults by OS level

IBM i 5.4 - Classic 1.4.2 64 bit
IBM i 6.1 - IT4J 5.0 32 bit
IBM i 7.1 - IT4J 6.0 32 bit
IBM i 7.2 - IT4J 7.1 32 bit
IBM i 7.3 - IT4J 8.0 32 bit

Select the Java Version

Command to set/change the IBM i OS default JDK:

```
ADDENVVAR ENVVAR(JAVA_HOME)
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk60/32bit')
LEVEL(*SYS) REPLACE(*YES)
```

The JVM job would have to be restarted to pick up the change.

Command to set/change the IBM i JDK for your job:

```
ADDENVVAR ENVVAR(JAVA_HOME)
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk60/32bit')
LEVEL(*JOB) REPLACE(*YES)
```

Other possible settings...

VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk14/64bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk50/32bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk50/64bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk60/32bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk60/64bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk626/32bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk626/64bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk70/32bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk70/64bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk71/32bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk71/64bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk80/32bit')
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk80/64bit')

Zipping the LARGE file

```
ADDENVVAR ENVVAR(JAVA_HOME) REPLACE(*YES)
VALUE('/QOpenSys/QIBM/ProdData/JavaVM/jdk80/64bit')
LEVEL(*JOB)

cd '/home/user1'

QSH CMD('jar cfM CUSTITEMPR.ZIP  CUSTITEMPR.TXT')
```

This .TXT file is 28GB.

It zips in 13 minutes while using about 0.25 processor.

The result is a 2.3GB file which moves across the link in under 40 Minutes.

The target system operates Windows. It sees .ZIP as a compressed folder which can be natively read, unzipped or extracted.

Scenario:

- Customer/item pricing data file
- Produced daily after Midnight in Knoxville
- Ready to cross the WAN to GR by 3am

```
wrklnk '/home/user1/CUSTITEMPR.TXT'
Size of object data in bytes . . . . . :   29,582,702,600
```

- Compressed to 2.3GB
- Moves across the WAN link by 4am
- Order receiving system distributes the data to handheld order taking devices that work off-line through the day.
- Devices are synced starting at 6am.
- That works :)

Thank you.

Sundry Links and References

Supported IBM Java Development Kit (JDK) Versions by IBM i Operating System Version and Release
http://www-01.ibm.com/support/docview.wss?uid=nas8N1011999

IBM i 7.1 - Support for multiple Java Development Kits (JDKs)
http://www.ibm.com/support/knowledgecenter/ssw_ibm_i_71/rzaha/multjdk.htm

Java 7.0 on IBM 7.1. - iTech Newsletter - August 2014
http://www.itechsol.com/newsletters/2014-08.html

Google: ibmi java se 7 64 bit - News of Java on IBM i
https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20i%20Technology%20Updates/page/News%20of%20Java%20on%20IBM%20i

Google: ibmi JAVA_HOME - Changing Default Version for JDK (java.version)
http://www-01.ibm.com/support/docview.wss?uid=nas8N1017748

IBM i and Zip Files - Published: January 11, 2012 by Ted Holt
http://www.itjungle.com/fhg/fhg011112-story02.html

Network Throughput Calculator
http://wintelguy.com/wanperf.pl

Java Platform Standard Edition 8 Documentation
http://docs.oracle.com/javase/8/docs/

JDK Tools and Utilities
http://docs.oracle.com/javase/8/docs/technotes/tools/index.html

Java Archive Files
http://docs.oracle.com/javase/8/docs/technotes/guides/jar/index.html

JDK Installation for Microsoft Windows
https://docs.oracle.com/javase/8/docs/technotes/guides/install/windows_jdk_install.html

Java Downloads for All Operating Systems
http://www.java.com/en/download/manual.jsp

Java SE Downloads
http://www.oracle.com/technetwork/java/javase/downloads/index-jsp-138363.html#javasejdk

Readme Files - JDK ReadMe
http://www.oracle.com/technetwork/java/javase/jdk-8-readme-2095712.html

Java SE Development Kit 8 Downloads
http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html

End of list.