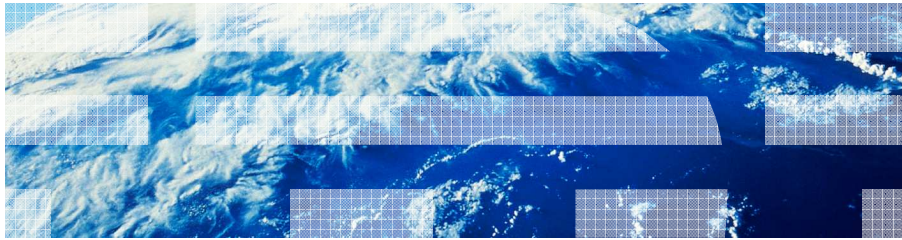# CICS Transaction Server V4.2

Overview of 64-bit Java support

CICS® Transaction Server Version 4.2 has significantly enhanced its Java™ support to provide a scalable environment that lifts some of the restrictions when running Java applications in CICS regions.

Agenda

- IBM 64-bit SDK for z/OS®, Java Technology Edition, V6.0.1
- 64-bit benefits for JVM servers and pooled JVMs
- MEMLIMIT calculations
- Co-requisites with other products

Overview of 64-bit Java support

This module provides an overview of the 64-bit support that is available to improve the scaling of Java applications.

IBM 64-bit SDK for z/OS, Java Technology Edition, V6.0.1

- 64-bit provides significant more storage
  - Removes significant constraint and complexity in managing large Java workloads
  - Applies to JVM servers and existing pooled JVMs
  - No Java application changes
- V6.0.1 is IBM zEnterprise™ optimized for significant performance gains
  - Exploits new z196 / z114 instruction set
  - Improved garbage collection and just in time compiler
  - Eligible for offload to zAAP
- Removed support previous and 31-bit JVM versions

Support for the 64-bit SDK provides significant savings in storage and removes the constraint for running many JVMs in a single CICS region. The SDK can be used with JVM servers and existing pooled JVMs. The main changes are that the Java stack and heap are allocated in 64-bit storage, allowing many more JVMs to run in each region. It also means you can run with larger caches and reduce the frequency of garbage collection. You do not have to change your Java applications, but you must ensure that any code using the Java Native Interface can run in 64-bit. 64-bit drivers are also available for DB2® and WebSphere® MQ.

Version 6.0.1 is optimized to run on System z®. It exploits the new instruction sets, has improved garbage collection and just-in-time compiler, and work is eligible to run on a zAAP. You cannot run previous versions of the SDK and you must use the 64-bit version of 6.0.1. The 31-bit version is not supported by CICS.

64-bit JVM server

- Much larger heaps possible
- Garbage Collection runs after an allocation failure
  - CJGC transaction is no longer used
  - Default GC policy uses more efficient gencon model
  - Heap dynamically sized by JVM

Overview of 64-bit Java support

64-bit support for JVM servers means that much larger heap sizes are possible. The garbage collection policy is gencon, so garbage collection runs after an allocation failure. Garbage collection is not managed by CICS, so the CJGC transaction is not used. Instead the heap is dynamically sized and managed by the underlying JVM.

64-bit support for JVMs has lifted the restriction on how many JVMs can run in a CICS region. Now more than a hundred pooled JVMs can run in a CICS region. As with JVM servers, the heap size can be much larger, which reduces the impact of garbage collection on the application. There are a few profile changes required when upgrading your Java environment to CICS TS 4.2. The home for Java has changed to point to the location of the 64-bit SDK. This value is customized during the installation of CICS and reflected in the sample profiles. Also the USSHOME system initialization parameter has replaced the CICS home option in the JVM profile. Ensure that your CICS region has a value specified for the USSHOME parameter. For further information, check the appropriate Upgrading guide in the CICS TS 4.2 Information Center.

MEMLIMIT z/OS parameter

- Java stack and heap are now allocated in 64-bit storage

- 64-bit requirement per pooled JVM
    - –Xmx value in JVM profile
    - HEAP64 value in DFHJVMRO (default 8M)
    - LIBHEAP64 value in DFHJVMRO (default 1M)
    - STACK64 value in DFHJVMRO (default 1M) times 5 (application thread plus system threads)

- 64-bit requirement per JVM server
    - –Xmx value in JVM profile (default 256M)
    - HEAP64 value in DFHAXRO (default 100M)
    - LIBHEAP64 value in DFHAXRO (default 3M)
    - STACK64 value in DFHAXRO (default 1M) times number of threads
        - THREADLIMIT plus system threads
        - Number of GC helper threads depends on –Xgcthreads parameter

http://publib.boulder.ibm.com/infocenter/cicsts/v4r2/topic/com.ibm.cics.ts.performance.doc/topics/dfht3_dsa_memlimit.html

The MEMLIMIT parameter in z/OS controls how much 64-bit storage the CICS address space can use. This storage includes the CICS dynamic storage areas above the bar (collectively called the GDSA) and MVS storage in the CICS region outside the GDSA. To calculate how much 64-bit storage is required for each pooled JVM, add up the maximum heap size from the JVM profile and the 64-bit Language Environment values in the DFHJVMRO program. To calculate how much 64-bit storage is required for a JVM server, add up the maximum heap size in the JVM profile and the 64-bit Language Environment values in the DFHAXRO program. For details of the calculation, see the section on calculating MEMLIMIT in the CICS TS 4.2 Information Center. Other services in CICS also use 64-bit storage, so the MEMLIMIT parameter has to account for all these services to ensure enough storage is available.

Co-requisites with other products

- JDBC and SQLJ
  - DB2 Version 8.1 or later required to support 64-bit applications
  - DB2 fix packs required for CICS TS 4.2 Java and OSGi bundles
- WebSphere MQ
  - 64-bit driver required
  - OSGi bundle required for JVM server
- Middleware bundles (WebSphere MQ and DB2)
  - Need to be added to JVM servers using OSGI_BUNDLES and LIBPATH_SUFFIX settings in JVM profile
- Native DLLs (JNI)
  - All native DLLs must be recompiled with LP64 compiler option and bound as AMODE(64)
  - Language Environment does not allow an AMODE(31) DLL to be loaded by an AMODE(64) DLL

  http://www-01.ibm.com/support/docview.wss?uid=swg27020857

If you want to connect CICS Java applications to DB2 using JDBC or SQLJ, you must be using DB2 Version 8.1 or later. You must have certain APARs installed for 64-bit and OSGi support. If you want to connect to WebSphere MQ, you must have the 64-bit driver for WebSphere MQ. An OSGi bundle is also required if you want to access WebSphere MQ from applications running in a JVM server. To use WebSphere MQ or DB2 from a JVM server, the appropriate middleware bundles must be added to the OSGI_BUNDLES and LIBPATH_SUFFIX options in the JVM profile. In addition, if you have any native DLLs, these must be recompiled with the LP64 compiler option. Language Environment does not allow a DLL that is declared as 31-bit to be loaded by a 64-bit DLL. For details of all the service that is required for CICS to work with other products, see the detailed system requirements that are published on the IBM website.

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