KB00109 TC/4690 Memory Use

This article provides additional details about memory use by various TC/4690 components.

Summaries of TC memory requirements for estimating purposes are:

- Small Mode - this configuration supports up to 20 non-ACE terminal sales applications. TC memory requirements are 14.5 MB plus 1.5 MB for each terminal instance.
- Large Mode this configuration supports up to 60 terminal sales applications (including ACE). TC memory requirements are 26.5 MB plus 1.5 MB for each terminal instance.
The information in this article applies to:

- QVS Terminal Concentrator for 4690

MORE INFORMATION

TC/4690 makes use of a significant amount of 4690 controller memory. Often, it uses more memory than any other single controller program.   Because of this and because 4690 OS is a non-virtual memory operating system, TC memory footprint can be more of a question in 4690 than it is in other environments. The following describes, in some detail, the make-up of TC memory footprint.

TC memory use fits into the following categories:

- TC base amount (for TC code and data) (TCBase)
- Shared memory for TC use (TCShMem)
- Shared memory for application and (optionally) shared runtime library code (AppShMem)
- Base amount for supporting a Terminal Sales instance (4690 OS overhead for a process, TC overhead for a process) (AppBase)
- Data requirements for a Terminal Sales instance (module data, module stack, dynamic memory requests) (AppData)

The formula for estimating TC total memory use is:

TCBase + TCShMem + AppShMem + (x)(AppBase + AppData) where x = tcMaxTerms.

TC currently supports two different shared memory options: tcshmem6 and tcshmem18. The following is additional information on each option:

tcshmem6 - this option gives TC access to 6.5MB of shared memory. 4 MB is for TC use (TCShMem) and 2.5 MB is for use by application code segments (AppShmem).   The 2.5 MB for application code allows a 2 MB application and a smaller application to run under TC at the same time. The 4 MB for TC includes a 1.5 MB base amount plus 2.5 MB for per-instance requirements. This module is designed to support up to 20 non-ACE terminal sales applications. It does not support ACE because ACE requires shared runtime libraries.

tcshmem18 this option gives TC access to 18MB of shared memory. 10 MB is for TC use (TCShMem), 4 MB is for application code segments and 4MB is for SRTL code segments (AppShMem).   The 4 MB for application code supports two 2 MB sales applications.   The 10 MB for

TC includes a 1.5 MB base amount plus 7.5 MB for per-instance requirements. This module is designed to support 60 or more terminals (clients) of any application type.

Conservative values for the various variables are as follows:

TCBase   8 MB

TCShMem   4 MB or 10 MB (tcshmem6 and tcshmem18, respectively)

AppShmem   2.5 MB or 8 MB (tcshmem6 and tcshmem18, respectively)

AppBase   1 MB

AppData   .5 MB

As an example, for a system supporting 20 terminals of SA, TC/4690 memory requirements would be:

8 MB + 4 MB + 2.5 MB + (20)(1 MB + .5 MB) = 44.5 MB

Some notes about this example:

- 30 MB of the 44.5 MB is terminal-instance related (AppBase + AppData)
- Because the 2 MB of code space is part of the permanent base TC amounts, terminal sales code enhancements do not typically change TC memory requirements by a significant amount. Only enhancements that require additional data space affect memory use.
- If TC were configured for 20 terminals but only 12 were active, the requirements would be:
  8 MB + 4 MB + 2.5 MB + (20)(1 MB) + (12)(.5 MB) = 40.5 MB

- If TC were configured with tcMaxTerms=20 and tcMinTerms=12 and only 12 terminals were active, the requirements would be:
  8 MB + 4 MB + 2.5 MB + (12)(1 MB + .5MB) = 32.5 MB

Memory Leak Protection

A concern when running terminal sales on the controller is that if terminal sales has a memory leak, it has the potential for taking down other terminals and possibly other important controller applications. TC provides a mechanism to protect errant terminal sales applications from using up all controller memory. The same mechanism can keep TC from starting additional sales instances than the system has memory for even when there is no leak. The mechanism is fairly simple and is described later where the tcMinCtlrFreMemKB configuration keyword is defined.

Controller Free Memory Display

TC displays the amount of controller free memory as part of its message line on the 4690 background task screen. An example of TC status lines is:

NAME=TC_BIN:TC4690.286   PARM=

STATUS=ACTIVE   MESSAGE=10 Terminals Active; FreeMem 8074 KB

TC Memory Configuration Values

Configuration parameters for TC are found in the file: C:\tc46\qcdifile.mst. Configuration keywords that affect memory use:

tcMaxTerms - maximum number of terminals/clients supported by TC.

tcMinTerms number of terminals that TC should pre-initialize. Pre-initializing all terminal instances is TC default behavior. Setting this value to something less than tcMaxTerms allows all stores to be configured with the same tcMaxTerms value but for less memory to be used in stores that have fewer terminals. This keyword is supported in TC/4690 release 2.0.99.45 or later.

tcShMemDll identifies the shared memory module that TC will use.

tcMinCtlrFreeMemKB specifies, in KB, the amount of controller memory that must be free for TC to grant application memory requests. If the amount of controller free memory is below this value, TC will fail application dynamic memory requests including requests to start a new instance. TC will also generate a SEV 1 error to the 4690 event log. This keyword is supported in TC/4690 release 2.0.99.45 or later.

Tools For TC/4690 Memory Analysis

TC/4690 ships with a simple tool for looking at 4690 controller memory use. The tool, MEM.286, displays the same kind of memory use information that 4690 CHKDSK does.

Application memory use information is available by formatting TC panic files. To generate a .PAN file by force, run tprocess k1. To format a .pan file run e46dumpf systemt against the generated systemt.pan file. The output file, systemt.out, contains a section on application memory use.

TERMRPAM Memory Use

TERMRPAM is a TC/4690 client that is used in real IBM point-of-sale terminals. TC/4690 with TERMRPAM can be used to extend the life of IBM POS terminals that have limited memory and CPU resources and/or which are attached to a slow LAN (such as a 4690 store loop).

TERMRPAM is a relatively small program. It requires about 275 KB of memory and has no dynamic memory requirements.