Changing Between Large and Small Address Models

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About this Document

This document describes how to change to the Large Address-Space Model, which may be required for some applications which manipulate large amounts of data. This document applies to all levels of AIX 3.2. and later.

About Small and Large Address-Space Models

The RISC System/6000 divides the address space into sixteen equally sized segments of 256MB. When a program is loaded, by default a single segment is allocated to program text (executable instructions) and a second segment is allocated to program data (heap, stack, user block).

This arrangement is sufficient for most applications. Applications which manipulate large amounts of data, however, may require more than one segment for program data. This is facilitated with the "Large Address-Space Model", which is described in InfoExplorer in the article "Large Program Support Overview".

When an application is compiled, the loader stores the maximum data-segment size in the executable file. This value may be changed with the two scripts in the following section. These two scripts modify the executable file header and cause the executable to use the "Large Address-Space Model."

The Scripts

For each script, create a file and carefully enter the script text given below. Then put the two files in the system directory where local commands are stored. This directory must be in the $PATH environment variable for the commands to be found. The files must then be made executable with the "chmod" command "chmod 555 mksmall mklarge".

To change an executable command from the "Small Address-Space Model" to the "Large Address-Space Model", execute the script "mklarge" with the name of the file to be modified as the argument. To change an executable command from the "Large Address-Space Model" to the "Small Address-Space Model", execute the command "mksmall" with the name of the file to be modified as the argument.

For example, to make the "gprof" command use the large address-space model, execute the command:

```
mklarge /usr/ucb/gprof
```

This could be reversed with the command:

```
mksmall /usr/ucb/gprof
```

Note that these commands can only be executed by a user with write permission on the file being changed.

Note: Depending on how you are viewing this document, some characters in the following code may appear incorrectly. If the characters in the following list do not match their descriptions, be sure to change them in the code.

[	left bracket
]	right bracket
`	grave (back tic)

The "mklarge" Script

```
#!/bin/ksh
#
#   mklarge -- change executable to be "large address-space model"
#
if [ $# -ne 1 -o ! -f "${1}"  -o ! -x "${1}" -o ! -w "${1}" ]; then
   /bin/echo 'usage: mklarge file'
   exit 1
fi
MAGIC=`/bin/dd bs=1 count=2 if=${1} 2>/dev/null`
TEST=`/bin/echo '\001\0337\c'`
if [ "${MAGIC}" != "${TEST}" ]; then
   /bin/echo "${1} is not an executable file"
   exit 1
fi
/bin/echo '\200\0\0\0' | \
   /bin/dd of=${1} bs=4 count=1 seek=19 conv=notrunc 2>/dev/null
exit 0
```

The "mksmall" Script

```
#!/bin/ksh
#
#mksmall -- change executable to be "small address-space model"
#
if [ $# -ne 1 -o ! -f "${1}"  -o ! -x "${1}" -o ! -w "${1}" ]; then
   /bin/echo 'usage: mksmall file'
   exit 1
fi
MAGIC=`/bin/dd bs=1 count=2 if=${1} 2>/dev/null`
TEST=`/bin/echo '\001\0337\c'`
if [ "${MAGIC}" != "${TEST}" ]; then
   /bin/echo "${1} is not an executable file"
   exit 1
fi
/bin/echo '\0\0\0\0' | \
   /bin/dd of=${1} bs=4 count=1 seek=19 conv=notrunc 2>/dev/null
exit 0
```

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