



AIX Questions

Compiled by Daryl Green

The AIX Solution Provider Technical Support Group in Austin, Texas, supports software vendors who are developing or porting applications to AIX. This article is a compilation of questions that are frequently asked by vendors. The name of the responding Technical Support Group staff member appears after each response.

How do I change the default values of `tcp_keepidle` and `tcp_keepintvl` obtained from the `no` command?

Log in as root and run the following commands:

```
/usr/sbin/no -o
tcp_keepidle=<timeout-value>
/usr/sbin/no -o
tcp_keepintvl=<timeout-value>
```

Note that `tcp_keepidle` and `tcp_keepintvl` are both measured in half-seconds. For example, `tcp_keepidle=150` is actually 75 seconds. The new settings will remain until you reboot the system. To overwrite default values permanently, include these commands in the `/etc/rc.net` file.

—Viral Shah



Viral Shah

Is the procedure for reducing paging space in AIX 4.1.2 different from the standard procedure in AIX 3.2.5?

You can use the AIX 3.2.5 standard procedure to reduce paging space in AIX 4.1.2. The only difference with 4.1.2 is that the primary system dump device is incorporated with the swap device, `/dev/hd6`. So you must first redirect the

dump device using the `sysdumpdev -p` command. Then remove the paging space and re-create it with a reduced size by following the AIX 3.2.5 standard procedure.

—Priya Mvada

How do I restore certain specific files from an AIX 4.1.2 `mksysb`? I tried the following, but it did not work:

```
tctl -f /dev/rmt0 rewind
tctl -f /dev/rmt0.1 fsf 3
tar xvf /dev/rmt0 ./<path>
```

The `mksysb` in AIX 4.1 is now in backup/restore format; you cannot use `tar` (as you did in AIX 3.2). Use the following command to restore specific files in AIX 4.1.2:

```
restore -so -xvf /dev/rmt0.1 ./<path>
```

—Priya Mvada

Is it possible to install only the man pages without having to install the entire InfoExplorer database?

You can select the components that you want from the `/usr/lpp/info/data/ispaths` file and choose to install only those from the InfoExplorer `cd` through System Management Interface Tool (SMIT). If InfoExplorer has already been entirely installed, you can choose the `deinstall` option from SMIT and remove the components that you do not need. Typically, `man` would require `nav`, `cmds`, `files`, `smith`, and possibly `aixtechref`. You need `X11tech` and `OpenGL™` only if you are doing



Priya Mvada

related work; man does not search after the seventh stanza, so the rest does not matter.

—Priya Mvada



How can /dev/null be re-created if it was accidentally deleted?

Run the following two commands:

```
# rm /dev/null
# mknod /dev/null c 2 2
```

Then change the permissions on /dev/null to 666:

```
# chmod 666 /dev/null
```

—Priya Mvada



How can I obtain a list of kernel extensions currently loaded on the system?

The /usr/bin/genkex command displays the address, size, and pathname for each kernel extension currently loaded on the system.

—Jeff Simon



How can I obtain a list of objects for each process currently running on the system?

The /usr/bin/genld command prints a report containing the process ID and name, followed by a list of objects loaded for that process, as well as each object's address and pathname.

—Jeff Simon



I have Base Operating System (BOS) 4.1.3 installed. How do I increase the number of licensed users on the system?

Do the following as root:

```
<smitty>
  System Environments
    Change / Show Number of Licensed Users
```

Next, reboot the system for any changes to take effect. If you are unable to change this parameter, you may not have the required software

installed on your system. Enter the following command to see if this software is installed:

```
lspp -l | grep bos.sysmgt.login
```

—Jeff Simon



How can I obtain the name of a function being used by a thread within DBX?

Within DBX use the thread command, then look under the function field.

—Jeff Simon



How can I use DBX to display information pertaining to the current thread being used?

This can be obtained with the following:

```
(dbx) thread current
```

—Jeff Simon



How can I set the time/date for a host on a network?

Use the /usr/sbin/setclock command. Token Ring must be installed and TCP/IP must be working to use this command. The setclock command gets the time from a network time server, and sets the local time and date accordingly.

—Jeff Simon



What is the purpose of shr.o file in the C library?

The shr.o file contains system calls and handlers; it is dynamically loadable and sharable by default.

—Jeff Simon



How do I determine whether I have the C for AIX compiler or the C Set++ compiler installed in AIX 4.1?

If both the x1C.C++.cmp and x1C.C filesets are installed, then the C Set++ compiler is installed.



Jeff Simon

```
1. cc -qroconst -o <output> <filename>.c // -qroconst will write to text
2. size -f <output> ->>
```

<output>: 380(.text) + 64(.data) + 16(.bss) + 302(.loader) = 762

```
3. cc -o <output> <filename>.c // for comparison
4. size -f <output> ->>
```

<output>: 280(.text) + 164(.data) + 16(.bss) + 302(.loader) = 762

Figure 1. Using -qroconst to compile source code

If only the x1C.C fileset is installed, the C for AIX compiler is installed. (C for AIX is a subset of C Set++ compiler. C for AIX compiles only C programs, whereas C Set++ can compile both C and C++ programs.)

Use `ls|pp -l <filesset name>` to check the system's fileset installation.

—Darshan Patel



All of my build tools use the CC command to invoke the C++ compiler, but AIX uses the x1C command. How do I use CC instead of x1C to invoke the C++ compiler without modifying build tools?

First create a new stanza CC in `/etc/x1C.cfg` with the same attributes as x1C. Then link CC to x1C.

—Darshan Patel



I have a stripped object file. When I link the stripped object file, I get an error message “ld: 0711-710 ERROR: Input file empty is stripped. The file is being ignored.” Can I link the stripped object file?

No. Stripping removes (or does not generate) the symbol table. Without a symbol table, the file cannot be linked.

—Darshan Patel



How can I write to the text segment of an executable?

Compile the source code with `-qroconst`, as shown in Figure 1.

Compiling with `-qroconst` will write to the text segment (the default is to write to the data segment). Note that pointers and complex aggregates containing pointer members cannot be placed in the text segment.

—Jeff Simon



When I link my program on AIX 3.2, I get the error message “0706-781 ERROR: TOC OVERFLOW.” What is causing this error message and how can I resolve it?

The error message is generated because the program exceeds the maximum TOC size limit of 64 KB.

One way to bypass the problem includes the following:

- ◆ Split the program into shared libraries.
- ◆ Limit the number of global/static variables.
- ◆ Put all the global variables in a single structure and get only one TOC entry for that structure.

Another solution is to install PRPQ P91128, which allows you to exceed the maximum TOC size limit of 64 KB. To obtain this PRPQ, call 1-800-IBM-CALL or contact your local IBM marketing representative. Be sure to specify `-bbitoc` flag with `ld` to allow for the larger TOC size.



Darshan Patel

```
usage: dtconfig -e|-d|-kill|-reset
-e (enable auto-start of dtlogin)
-enograph (enable auto-start of dtlogin without graphical boot)
-d (disable auto-start of dtlogin)
-kill (kill dtlogin)
-reset (reset dtlogin - reread configuration files)
```

Figure 2. Desktop configuration options

The AIX 4.1 binder has removed this limitation by creating second level TOC information.

—Darshan Patel

I am trying to strip a large executable file using the strip command and I am getting error message “0654-404 Cannot write to file”. How can I resolve this error message?

The /tmp filesystem is running out of free space, causing the error message. The strip command uses the /tmp filesystem to create the file and to protect it against being killed. Depending on how the executable was compiled, it may require a lot of storage in /tmp.

If your system is AIX 3.2, you must find more space for /tmp. If your system is AIX 4.1, then you can set the environment variable TMPDIR to a directory to use for the temporary file on a filesystem with more space, and strip will use that instead.

—Darshan Patel

How do I control the behavior of the Common Desktop Environment (CDE) login interface on the system console?

By default, /etc/inittab sources /etc/rc.dt to start the CDE login by executing /usr/dt/bin/dtlogin when the system boots. This will display a CDE login on your system and to any Xterminals requesting a login via XDMCP. To serve a CDE login to Xterminals only and to have the familiar green and black common character mode displayed on the system console, you must comment out the following

from your Xservers file as defined by your Xconfig file:

```
:0 Local local@console
/usr/lpp/X11/defaults/xserverrc -T -
force :0
```

Note: By default, the dtlogin resource files are located under /usr/dt/bin and /usr/dt/config. Resource files in these locations may be overwritten when applying system updates; therefore, it is advisable to copy these files to their equivalent paths under /etc. Once these files are copied, further editing may be required to include the location of other resource files.

The desktop configuration utility /usr/dt/bin/dtconfig is used to manage dtlogin. Entering /usr/dt/bin/dtconfig by itself will display the available options as shown in Figure 2.

The -enograph option is similar to the -e option. However, this flag will disable the AIX console message window and the background AIX logo. The system will boot with the messages displayed in common character mode.

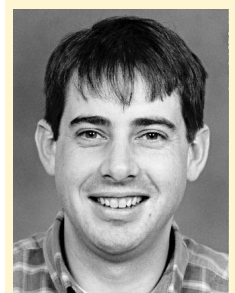
—David Stewart

I have two display adapters (see Figure 3) installed in my system. How do I determine which one is the default, and how do I change it?

With AIX 3.2.x, you can use # lsdisp.

Next, use the following command to list the attributes of hft0:

```
lsattr -El hft0 | grep console
```



David Stewart

Name	Description
POWER_Gt4xi:1	Graphics Adapter
hiprf3d:2	High-performance 3-D color graphics processor

Figure 3. Display adapters

You should see the following:

```
console 1 Physical display for HFT
console True
```

The 1 listed corresponds with the number in the first column from `lsdisp`.

Next, enter the following:

```
chdev -l hft0 -a default_disp=<adapter>
-a console=<n> -P
```

where `adapter` is the device listed in the first column of the `lscfg | grep -I graph` output and `n` = the console number. Determine the console number by examining the output of `lsattr -El hft0 | grep console`. If the current console number is 1 and you have two display

adapters, then you will use 2 for `<n>`. If the current console number is 2 and you have two adapters, then `<n>` will be 1.

Once the machine is rebooted, this change will take effect.

In AIX 4.1 this operation is much less complicated. You can use the following procedure:

Take note of the `DEV_NAME` column from the output of the `lsdisp` command in Figure 4.

Use this output with the `chdisp` command. The proper usage is shown in Figure 5.

Example: `chdisp -pgda0` will change the `colorgda` adapter to be the default display adapter upon subsequent reboot.

—David Stewart



Sometimes when I bring up a new machine, it hangs on a blue screen with the words “Starting the Common Desktop Environment” or it shows the following error: “The DT Messaging system could not be started.”

Enter the following to correct the problem:

1. Choose [OK] to return to the login screen.
2. Select Failsafe Session from the login screen’s option.
3. Make sure the hostname is correct in these locations:

```
/etc/src.sh
/etc/hosts
/usr/adm/inetd.sec
```

The cause of the above scenario is generally faulty network configuration. In AIX 4.1, CDE and the network are very closely related. You can verify the following:

1. Is the hostname set (If you type `hostname`, does it return the proper value)?
2. Can you resolve the hostname of the machine (Is the proper value returned when you type `host <hostname>` or `host <IP-address>`)?
3. Are the network interfaces properly configured (If you type `netstat -in`, do you see the proper interfaces)?

DEV_NAME	Slot	Bus	ADPT_NAME	Description
ppr0	03	mca	POWER_Gt4x POWER Gt4	Midrange Graphics Adapter
gda0	07	mca	colorgda	Color Graphics Display Adapter

Figure 4. Output from `lsdisp`

Usage	Function
<code>chdisp [-dDeviceName] [-pDeviceName]</code>	Changes the default display
<code>-d</code>	Changes the default display for this session
<code>-p</code>	Changes the default display in the database; effective at the next IPL
DeviceName	Represents the logical name of the display; the name in the first column of output of the <code>lsdisp</code> command

Figure 5. The `chdisp` command

4. Are you using DNS or NIS? Check for the proper configuration (that is, permissions and structure of `/etc/resolv.conf`).

—Michael Hinegardner



How would I prevent users from being able to open a terminal session via the window manager menus in CDE?

Use a “restricted mode,” which not only removes the “Open Terminal” option from the window manager menus, but it also keeps users from leaving their home directory when using the file manager (`dtfile`).

To restrict terminal use, it is necessary to enter the following resource to `/usr/dt/app-defaults/Dtfile`:

```
*restrictMode: True
```

Note: Since this is a resource, it can be placed in any given resource file such as `.Xdefaults`.

—Michael Hinegardner



I am having problems with an application written using the `SIOCGIFCONF ioctl()`.

In AIX 4.1, the implementation of the `SIOCGIFCONF ioctl()` is similar to the BSD Version 4.4. The structures returned are variable length; binary compatibility is provided to AIX 3.2.5 applications. There is also a variant `OSIOCGIFCONF` provided for AIX 4.1 applications that expect the same behavior as AIX 3.2.5. In Version 3.2.5 you must have been setting the `compat_43` option for BSD 4.3 compatibility (`no -a`). AIX 4.1 no longer requires this.

—Carl Senegal



What is the general procedure to follow if the system crashes while booting (flashing 888 on the LED panel)?

Since most crashes are caused by the last event that happened on the system, we can assume that the last LED before the system started to dump is the cause. Note the LED.

◆ If this LED is configuring some hardware device, contact hardware support for help.

◆ If this LED is configuring some software, contact your appropriate software support organization for help. Contact your software support organization if you cannot determine what the LED means.

—Carl Senegal



While running an application, I receive an error message saying the maximum number of file locks have been exceeded. How can I tell if there are any unused lock entries?

The maximum number of file locks is limited to 2,000 per process and 200,000 for the system. This is hardcoded and cannot be configured. The `pstat -T` command provides (among other things) the number of lock entries currently available for use.

—Priya Mvada



Is there a way in AIX 3.2.5 to exempt specific users from the password restrictions specified in the `/etc/security/login.cfg` file?

The entry `flags=NOCHECK` can be added to the stanzas of these users in the file called `/etc/security/passwd`.

—Priya Mvada

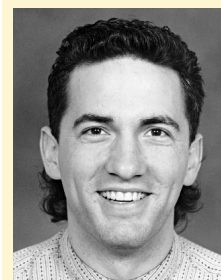


What is the procedure to retrieve just one file (for example, the `/etc/passwd` file) from a backup tape?

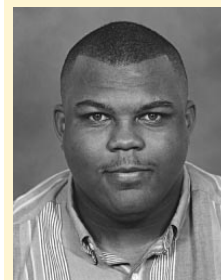
With the backup tape in the drive (which we assume is called `/dev/rmt0`), run the following sequence of commands:

```
tctl rewind
tctl fsf 3
cd /
tar -xvf/dev/rmt0.1 ./etc/passwd
```

—Priya Mvada



Michael Hinegardner



Carl Senegal

What is the correlation between the return value of the `pthread_self()` subroutine and the thread identifiers assigned by `dbx` to threads?

The `thread info` command shows detailed information about each thread. One of the items is labeled `thread (pthread addr):`. The address displayed is eight bytes more than the value returned by `pthread_self()`. The exact number of differing bytes may change from release to release, but the printed address will always be some small number of bytes beyond the `thread_self()` value.

—Manohara Yarehalli



I was porting from AIX 3.2 to 4.1 and I received the following warning: “0711-327 Warning: entry point not found `_nostart`”.

In AIX 4.1, use the `-bnoentry` option instead of `-e _nostart`.

—Manohara Yarehalli



Why does my `lpstat` command print a double entry?

The reason is because the printer is physically attached to a remote queue. The first entry in the `lpstat` output corresponds to the local queue. The second entry corresponds to the remote queue.

—Daniel Pedraza



3. Select System Environments
4. Select Manage Language Environment
5. Select Change Language Environment
6. Press F4 to generate a list of available languages
7. Select the desired language and press Return
8. Exit SMIT
9. Reboot the system and the change will take effect

—Daniel Pedraza



What is the best way to clear out my old TCP/IP networking interfaces and start over again as if it were a new machine?

Perform the processes shown in Figure 6.

Token-Ring

```
# ifconfig tr0 detach
# rmdev -l tr0 -d
# rmdev -l tok0 -d
```

Standard Ethernet

```
# ifconfig en0 detach
# rmdev -l en0 -d
# rmdev -l ent0 -d
```

802.3 Ethernet

```
# ifconfig et0 detach
# rmdev -l et0 -d
# rmdev -l ent0 -d
```

Figure 6. Clear old TCP/IP interfaces

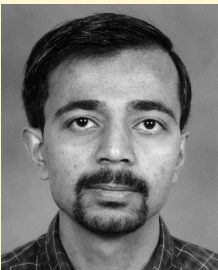
—Craig Stermer



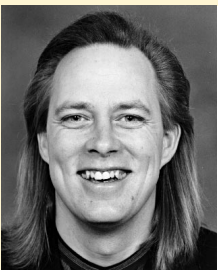
What is the maximum number of SPX connections allowed with NetWare/6000?

Version 3.11A allows up to 250 connections.

—Craig Stermer



Manohara Yarehalli



Craig Stermer

How many NetWare engines should I run on a server running NetWare/6000?

It is recommended that you run one engine for every 10 users. This is a general recommendation and can change because of system load.

—Craig Stermer



Why do applications using the SO_KEEPALIVE function not die when the application terminates abnormally?

AIX supports applications, such as telnet, that use the SO_KEEPALIVE function and implements the tcp_keepidle and tcp_keepintvl parameters within the no command to keep track of inactivity on established sessions. The supplied default for both AIX Version 3 and Version 4 results in a timeout of 2 hours 10 minutes, which is calculated as follows:

```
tcp_keepidle = 14400 half seconds or 7200
seconds or 120 minutes or 2 hours
```

This timer tracks the period of inactivity on a session. If a command is entered, the timer then resets. It waits for two hours before taking any action on an inactive session. When that timer expires, AIX then sends a probe to the original site to determine if the system is still active. If it receives a positive response, it leaves the session in an established state. If it gets no response, it will send a further eight probes (nine total) at an interval designated by the tcp_keepintvl parameter.

```
tcp_keepintvl = 150 half seconds or 75
seconds
```

If AIX receives no response after the ninth probe, 2 hours 10 minutes after the session was established, it kills the session and releases all resources associated with the session—if it is able to do so. If an application does not accept the kill signal, the application remains active and the session remains established.

The user can customize this timeout scenario by altering the two parameters in the no command as follows:

```
no -o tcp_keepidle=7200
no -o tcp_keepintvl=75
```

This would cut the default timeout in half if these commands were run from the command line, but they would only be current for the duration of the system boot. When the system is rebooted, these parameters will reset to the system defaults. To overcome this, it is recommended that the user's preferred parameters are set by adding the no -o commands to the end of the /etc/rc.net startup script, which is run at every reboot.

—Richard Barnett



How do I prevent rexec, ftp, rsh, and rlogin from always prompting me for a password?

The rexec and ftp commands make use of a \$HOME/.netrc file on the user's local system when connecting to a remote system. This enables the user to provide user account and password details for use at the remote site. The \$HOME/.netrc file must have 600 permissions (-rw---) and be owned by the local user. The format would look similar to the following:

```
machine test1 login user1 password
12345
```

In this case, the local user will be able to rexec or ftp to remote system test1 with user account user1 and password 12345 and would not be prompted for user account or password information. Because the password information is written in plain text, the file must have the correct permissions and ownership as stated above.

The rsh and rlogin commands use a \$HOME/.rhosts file on the user's target machine, giving details of which users are allowed to log in from which systems on the network. Again,

the `$HOME/.rhosts` file should have 600 permissions and be owned by the user account on the remote system. Its format would look similar to the following: `test2.austin.ibm.com user2`.

In this case, the user `user2` would be allowed to login to the remote system from the `test1` system without being prompted for user account or password details. Note that if Domain Name Services (DNS) is being used, the fully qualified hostname of the local system is required.

—Richard Barnett



`tcPIP`, selects “Further Configuration” and “Select BSD style rc Configuration”, then changes the parameter to `yes` from the default `no`, AIX will use the `/etc/rc.bsdnet` startup script instead of `/etc/rc.net` by default.

In the `/etc/rc.bsdnet` file, IBM has provided a sample hostname using the fully qualified hostname `aoot.austin.ibm.com`. If you do not change this to the required value, then the system will be known as this hostname. You either need to set the “Select BSD style rc Configuration” parameter back to the default `no` value or change the hostname in `/etc/rc.bsdnet`.

—Richard Barnett



Why is the hostname always reset to `aoot.austin.ibm.com` every time I reboot?

TCP/IP in AIX Versions 3 and 4 can be set up for BSD style configuration, although the default is not to use this option. If the user uses `smit`



SDO Moves/Improves WWW Home Page

IBM's Solution Developer Operations (SDO) has restructured its WWW home page to add new functions from the recently announced Solution Developer Program (SDP) that will give information about the new program and allow online registration to become a member of the SDP. During the process, the URL was changed to emphasize the purpose of the page—information for developers.

The new home page includes a section that highlights product announcements from SDP members. These items can also be linked to the SDP member's home page. Complete information about including an announcement in this section is found in the SDP section of the home page.

The SDP section is an area exclusively for SDP members. When you register for the SDP using the online registration process, you receive an ID and password that allows you to access this restricted area of the home page where you find the following:

- ◆ Information about each of IBM's Partners in Development programs
- ◆ Latest news of interest to solution developers
- ◆ An extensive library of reference material and sample code for IBM's platforms
- ◆ Information about the facilities available at IBM's Solution Partnership Centers
- ◆ A Frequently Asked Questions (FAQ) section for browsing
- ◆ Online forums for getting answers to technical questions—for those who have signed up for technical support

Everything you need to get developer support for any or all IBM platforms is available through this one interface. Come visit us at our new URL:

<http://www.developer.ibm.com/>

and be sure to register for the Solution Developer Program.