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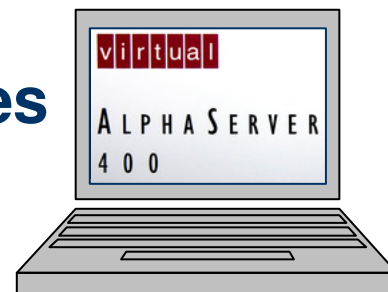


Continuity in Computing

FreeAXP™ Beta Release Notes

Version 1.0.8.283

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1. FREEAXP SUPPORTS 32 & 64-BIT WINDOWS HOST O/S

FreeAXP supports both 32 (x86) and 64-bit (x64) Windows host O/S. We test FreeAXP under the following Windows O/S and virtual machines:

Host O/S	x86	x64	Sun Virtual Box	VMware	Apple Parallels	Apple Boot Camp
Windows Server 2008		✓		✓		
Windows 7 Ultimate	✓	✓		✓		
Windows 7 Pro	✓	✓	✓		✓	✓
Windows 7 Home Premium		✓				
Windows Vista Business		✓				
Windows Ultimate		✓		✓		
Windows Vista	✓					
Window Server 2003		✓		✓		
Windows Server 2003 R2	✓	✓		✓		
Windows XP Pro	✓	✓		✓	✓	✓

2. NEW FEATURES, IMPROVEMENTS & FIXES

2.1 PERFORMANCE IMPROVEMENT

FreeAXP Beta 1.0.8.283 provides a 5% - 10% performance improvement over FreeAXP Beta 1.0.6.271.

2.1.1 Translation Buffers

FreeAXP Beta 1.0.8.283 implements faster translation buffers.

2.1.2 Performance Dependencies

The performance gains experienced will vary depending upon the Host and Guest O/S in use. For example, using FreeAXP Beta 1.0.6.271, Windows Server 2003 x64, and VMS 7.3-2, we recorded a 10% improvement. On the same hardware and version of FreeAXP under Windows Server 2003 x64 and VMS 8.3 we recorded a 14% improvement.

2.1.3 AlphaServer 400/166 Performance

As of FreeAXP Beta 1.0.6.271, 64-bit edition provides equal or better performance than a real AlphaServer 400/166 running on a dual-core Intel(R) Xeon(R) CPU 5150 @ 2.66GHz.

2.2 FLOATING POINT BUG FIX

FreeAXP Beta 1.0.8.283 corrects a problem with floating point calculations. The problem manifested itself under OpenVMS with BASIC, the symbolic debugger, and the Monitor utility. See section 5.2 for additional details on floating point implementation.

2.3 CHARON IDLE LOOP SUPPORT

FreeAXP 1.0.6.271 and subsequent releases supports the Charon idle loop. VMS system disks with the Charon idle loop driver installed will boot and run without issue under FreeAXP.

Note: The Charon idle loop can be enabled and disabled using the system parameter `LOAD_SYS_IMAGES`. The default is 7. Changing it to 6 (clearing bit 0 = `SGN$V_LOAD_SYS_IMAGES`) prevents `SYSS$IDLE` from being loaded during boot.

2.4 SECOND NIC

FreeAXP Beta 1.0.5.261 and subsequent releases include support for a second NIC to facilitate Tru64 clustering. The second NIC requires manual configuration. See section 4.1.5 for instructions on how to add a second NIC to a FreeAXP configuration. We will address adding the second NIC definition to the configuration wizard in a future release of FreeAXP.

2.5 TTA0 SERIAL PORT

The FreeAXP Beta 1.0.8.283 configuration wizard introduces a check box to enable the TTA0 serial port. By default TTA0 is enabled via telnet port 9001. The wizard allows the port to be changed.

However, the wizard does not yet remember the TTA0 serial port setting. Re-running the wizard will clear the port by default. If the wizard is re-run, you must remember to re-check the TTA0 box to enable the serial port.

3. KNOWN PROBLEMS

3.1 COPY PROBLEM WITH VMS 8.3 & PHYSICAL CD

There is a problem copying large files from a physical CD under OpenVMS 8.3. Prior to VMS 8.2, the default block size for copy operations was 63. This changed to 124 under VMS 8.3. When copying files from a physical CD data at 124 block intervals may be corrupted.

This is only a problem under VMS 8.3 and 8.4FT when copying data from a physical CD. CD ISO images and virtual disks are not impacted. See the following thread in the FreeAXP User Forum for a detailed problem description.

http://www.openvmshobbyist.com/forum/viewthread.php?forum_id=163&thread_id=864&pid=4005#post_4005

The work around is to either use a COPY /BLOCK=63 or BACKUP to move files off a physical CD.

Thanks! A special note of thanks to astrodanco, VolkerHalle, malmberg, and johncookson for all their diagnostic work on this problem.

3.2 CONFIGURATION WIZARD FORGETS TTA0 SERIAL PORT SETTING

The configuration wizard does not remember the TTA0 serial port setting. Re-running the wizard will clear the port by default. If the wizard is re-run, you must remember to re-check the TTA0 box to enable the serial port. This problem will be corrected in a future release of FreeAXP.

3.3 AMD PROCESSOR TIMING ISSUE

Symptoms:

- **OpenVMS:** The login prompts go by too fast to enter anything.
- **Tru64:** Response time at console slows sporadically when system has no load.

There is a known problem on AMD Athlon X2 systems that may cause various timing issues under FreeAXP. The problem is caused when the timestamp counters in each of the AMD CPU's drift apart over time since the last power-on.

This drifting of the timestamps causes a higher timer-interrupt rate on the emulated Alpha. The fix is to install an updated processor driver from AMD that ties the Windows time routines to a single CPU core. The update is available at

<http://support.amd.com/us/Pages/AMDSupportHub.aspx>.

3.4 PASTING LARGE AMOUNTS OF TEXT TO A SERIAL PORT

Pasting large amounts of text into either of the serial ports using PuTTY may result in data lost. On the console port (OPA0), this behavior is consistent with the behavior of the console on a real AlphaServer 400. We believe this to be a limitation of the console firmware. On the second serial port (TTA0), this seems to be an issue with PuTTY. We do not see the problem when using commercial terminal emulators like KEAterm or Smartterm.

3.5 VMS 7.0 LOGIN AFTER INSTALLATION

After installing OpenVMS 7.0, it is not possible to log in from the console. This is not a FreeAXP bug. The real AlphaServer 400 behaves the same way.

An alternative is to install the OpenVMS licenses during the installation process. It is then possible to log into the system via TTA0.

Another option is to execute a conversational boot to log into the system and install licenses. Here is one way to do this:

3.5.1 Conversational Boot

```
>>> B DKA0 -FLAG 0,1
SYSBOOT> SET/START=OPA0:
SYSBOOT> CONTINUE
```

The system will boot to the \$ prompt. Spawn a subprocess so you do not get logged off the console, then run the system startup procedure.

```
$ SET NOON
$ SPAWN
%DCL-S-SPAWNED, process SYSTEM_1 spawned
%DCL-S-ATTACHED, terminal now attached to process SYSTEM_1
$ @SYS$SYSTEM:STARTUP
```

The system will come up normally and give you back the \$ prompt when the startup procedure logs out. From there, spawn again to prevent being logged out of the console. You can now work you will on the system.

```
$ SET NOON
$ SPAWN
%DCL-S-SPAWNED, process SYSTEM_1 spawned
%DCL-S-ATTACHED, terminal now attached to process SYSTEM_1
$ SET DEF SYS$SYSTEM:
```

When you are finished, do another conversational boot and reset the startup file.

```
>>> B DKA0 -FLAG 0,1
SYSBOOT> SET/START=SYS$SYSTEM:STARTUP.COM
SYSBOOT> CONTINUE
```

3.6 VMS 6.2 – 7.1 CONSOLE ISSUE

We see an issue on two out of ten of our test systems when installing VMS 6.2, 7.0, and 7.1 from an ISO image. The VMS installation will run normally. During the final reboot after the automatic AUTOGEN phase, error messages similar to those shown below will be displayed. The system will boot, but you will be unable to log in via the console.

The workaround is to <Ctrl^P> the emulator and boot again. There is no need to restart the emulator. On the second VMS boot the problem goes away.

We've placed a thread titled [VMS 6.2 – 7.1 Console Issue](#) in the [FreeAXP User Forum](#). If you encounter this problem, please post your host hardware information and the Windows O/S under which you are running FreeAXP to this thread. Include whether it is a 32 or 64-bit edition of Windows.

```
%ADA-I-CONSTRAINT_ERRO, CONSTRAINT_ERROR
-ADA-F-CONSTRAINT_ERRO, CONSTRAINT_ERROR
%ADA-F-CONSTRAINT_ERRO, CONSTRAINT_ERROR
-ADA-I-EXCRAIPRI, Exception raised prior to PC = 00057B48
%%%%%%%%%% OPCOM 17-NOV-1858 00:00:05.15 %%%%%%%%%%%
Message from user SYSTEM on VMS062
%SECSRV-E-NOPROXYDB, cannot find proxy database file NET$PROXY.DAT
%RMS-E-FNF, file not found
```

```
%TRACE-E-TRACEBACK, symbolic stack dump follows
Image Name      Module Name      Routine Name      Line Number      rel PC      abs PC
ADARTL          0 00054C94      003DEC94
                0 80495D44      80495D44
----- above condition handler called with exception 00318324:
%ADA-F-CONSTRAINT_ERRO, CONSTRAINT_ERROR
-ADA-I-EXCRAIPRI, Exception raised prior to PC = 00057B48
----- end of exception message

                0 82F842BC      82F842BC
ADARTL          0 00037BBC      003C1BBC
SECURITY_SER    0 00047B48      00057B48
SECURITY_SER    0 0007D25C      0008D25C
%%%%%%%%%%%% OPCOM 17-NOV-1858 00:00:05.17 %%%%%%%%%%%%%
Message from user SYSTEM on VMS062
%SECSRV-E-NOPROXYDB, cannot find proxy database file NET$PROXY.DAT
%RMS-E-FNF, file not found

SECURITY_SER ADA$ELAB_SECURI    0 000300C0      000400C0
ADARTL          0 00054E18      003DEE18
ADARTL          0 00054594      003DE594
ADARTL          0 0003F4D0      003C94D0
SECURITY_SER ADA$ELAB_SECURI    0 0003005C      0004005C
SECURITY_SER    0 0008773C      0009773C
                0 83082170      83082170
```

3.7 VMS 6.2 INSTALLATION FROM CD

A VMS 6.2 installation from a physical CD will fail. We are working on resolving this issue. VMS 6.2 can be successfully installed from an ISO image.

3.8 VMS 6.2 NETWORK SUPPORT

FreeAXP currently supports a virtual DE500-BA NIC. VMS 6.2 is not fully compatible with the DE500-BA. Insert the following code into SYSTARTUP_VMS.COM to work around this issue and bring up DECnet and TCP/IP services.

```
$ @SYS$MANAGER:STARTNET.COM      !Start DECnet
$ MC NCP SET EXEC STAT OFF      !Shutdown DECnet
$ WAIT 00:00:10                  !Pause 10 seconds*
$ @SYS$MANAGER:STARTNET.COM      !Restart DECnet
:
$ @SYS$STARTUP:UCX$STARTUP.COM  !Start TCP/IP services
```

*Failure to pause long enough may result in a NETNOSTATE bug check.

3.9 WINDOWS VISTA, WINDOWS 7

If you experience problems launching FreeAXP or the configuration wizard, try using the "Run as Administrator" option.

3.10 PHYSICAL DEVICE ACCESS

When accessing a physical device like a CD-ROM, FreeAXP needs to run from an account with administrator rights.

4. TIPS & TRICKS

Items in this section will help you get the most out of FreeAXP.

4.1 NETWORKING NOTES

4.1.1 Dedicating a NIC

On dual NIC systems, and this includes systems with a hardware NIC and a wireless NIC, it is best to disable TCP/IP services on the NIC assigned the FreeAXP. Prior to launching FreeAXP, open the Properties box of the NIC assigned to FreeAXP and uncheck all items assigned to the NIC. This will prevent Windows from trying to share the NIC with FreeAXP. For users running FreeAXP on a system equipped with a wired and wireless NIC, assigning FreeAXP the wired NIC will provide more stable network performance.

4.1.2 Networking FreeAXP on a System with a Single NIC

Here is one way to network FreeAXP on a system that only has one NIC:

- 1) Download the OpenVPN 2.1.1 installation package for Windows from <http://openvpn.net/index.php/open-source/downloads.html>
- 2) Run the installation package, selecting only the "TAP Virtual Ethernet Adapter".
- 3) Refresh the system's Network Properties. A new network connection with "TAP-Win32 Adapter V9" as the description should now be available. Rename this virtual adapter to "FreeAXP NIC".
- 4) Go to the virtual "FreeAXP NIC" properties, choose "Configure", and on the "Advanced" tab set "Media Status" to "Always Connected".
- 5) Select both the physical NIC that is connected to the outside world and the virtual "FreeAXP NIC", right click, and choose "Bridge connections".
- 6) From a cmd window, run "NET STOP MSIPCAP" followed by "NET START MSIPCAP" to restart the FreeAXP PCAP driver.
- 7) Run the FreeAXP configuration wizard and choose the virtual "FreeAXP NIC" as the network adapter.

This configuration allows the creation of network connections between the emulator, the host system, and the external network.

4.1.3 Manually Modifying the FreeAXP MAC Address

Running more than one instance of FreeAXP on the same network may cause problems. The configuration wizard in FreeAXP uses the same MAC address for each configuration. To correct this, manually modify the NIC configuration in the .cfg file using a unique MAC address with a mac line similar to the following:

```
pci11 = de500
{
  adapter="\Device\MsiPcap_{B6BA9119-F3CE-4029-9E0C-F93E967FCCC5}";
  mac="08-00-3b-aa-bb-cc";
}
```

Note: Once a configuration has been manually modified, do not access it with the configuration wizard. Doing so will overwrite any changes you have made.

Warning: Do not set the LSB (multicast bit) of the first octet. Doing so makes the first number odd (ex. "09-00-2b-aa-bb-cc"), which violates the Ethernet MAC standard and will interfere with NIC functionality.

We will address automatically providing a unique MAC address in a future release of FreeAXP.

4.1.4 Networking with Wireless Ethernet

Setting the FreeAXP MAC to the same MAC address as your wireless card will allow sharing a wireless connections **AS LONG AS YOU DO NOT RUN DECNET PHASE IV**, which will forcibly change the FreeAXP MAC address to the DECnet phase IV address (AA-00-04-xx-xx-xx), breaking the wireless connection. Do not share the same TCP/IP address between the wireless host and your FreeAXP system, or you will confuse both systems.

4.1.5 Manually Configuring a Second NIC

FreeAXP supports two NICs. This feature is available primarily to support Tru64 clustering. Enabling the second NIC requires manual modification to the FreeAXP configuration file.

A second NIC is defined via the virtual *pci12* device. The following example depicts a second NIC definition:

```
pci12 = de500
{
  adapter="\Device\MsiPcap_{964C6727-2EBE-432E-95F0-FDE78ECCBBC1}";
}
```

The second NIC must be unique from the primary NIC. In the above example, the string `\Device\MsiPcap_{964C6727-2EBE-432E-95F0-FDE78ECCBBC1}` uniquely identifies the second NIC. This string is part of the Windows NIC definition. There are several ways to obtain this string:

- 1) Create a dummy FreeAXP configuration file defining the secondary NIC. Copy the *pci11* definition out of this file, changing *pci11* to *pci12*.
- 2) Use `adapter="ask";` in the *pci12* clause. FreeAXP will prompt for the desired NIC upon launch. Copy the NIC string and place it in the configuration file.
- 3) Look up the NIC ID via *regedit*. **Warning:** We do not advise using this method, as inadvertently modifying the Windows registry can disable a Windows system.

Note: Once a configuration has been manually modified, do not access it with the configuration wizard. Doing so will overwrite any changes you have made.

FreeAXP will automatically assign the second NIC a MAC address differing from the primary NIC. However, if running multiple instances of FreeAXP, the second NIC address will be duplicated like the first one. If running multiple instances of FreeAXP on the same network, manually set the MAC address of each NIC to unique values. See section **4.1.3**.

4.2 PERSONALALPHA & CHARON CONTAINER FILE

If you are attempting to boot a PersonalAlpha or CHARON-AXP system container file using FreeAXP, you may need to make the following changes to achieve a successful boot:

- Disable the CHARON Accelerator utility. As with real Alpha hardware, this extension will cause a boot check under OpenVMS.
- PersonalAlpha's NIC device shows up as ESA0. FreeAXP's NIC device shows up as EWA0. If booting from a PersonalAlpha image, you may need to reconfigure LAT, DECnet, and TCP/IP services.

4.3 DISK I/O

FreeAXP allows simultaneous access against up to 7 virtual disks. These disks can all exist as container files on a single physical disk on the host system. If you are running an application under FreeAXP that puts high I/O loads on multiple disks, you can easily saturate the physical disk controller, which in turn will adversely impact performance on the FreeAXP system.

To alleviate this problem, spread virtual disks across multiple physical disks if your FreeAXP application is I/O intensive across multiple volumes simultaneously.

4.4 MANUALLY ADDING A SECOND SERIAL PORT

FreeAXP supports two serial ports, the console (OPA0) and (TTA0). TTA0 can be added to the configuration file via the configuration wizard or manually. The following sample code shows OPA0 (serial0) assigned to port 9000 and TTA0 (serial1) assigned to port 9001.

```
serial0 = i16550
{
  s0_tn = telnet
  {
    port = 9000;
    wait = true;
    action = ""C:\Program Files\FreeAXP\putty.exe" telnet://localhost:9000";
  }
}
serial1 = i16550
{
  s1_tn = telnet
  {
    port = 9001;
    wait = true;
    action = ""C:\Program Files\FreeAXP\putty.exe" telnet://localhost:9001";
  }
}
```

4.5 SERIAL PORT LOGGING

FreeAXP supports logging activity at each serial port (OPAO and TTA0). To enable logging on a serial port, add the following code to the FreeAXP configuration file.

```
serial0 = i16550
{
  s0_log = logfile
  {
    filename="D:\FreeAXP\OPAO.log";
  }
  s0_tn = telnet
  {
    port = 9000;
    wait = true;
    action = ""C:\Program Files\FreeAXP\putty.exe" telnet://localhost:9000";
  }
}
```

Figure 1: Configuring serial logging on OPAO.

4.6 USING CDs AND DVDs

FreeAXP permits mounting and using real OpenVMS and Tru64 Unix CDs and DVDs. However, you will obtain much better performance if you create an ISO image of these devices. I/O on virtual CDs and DVDs is very fast, speeding up installations and data access.

We have had good luck creating Tru64 and VMS ISO images with ImgBurn, available free at (<http://www.imgburn.com/>).

5. OPENVMS SPECIFIC NOTES

- OpenVMS 8.3 requires a minimum of 64MB of memory to run.
- OpenVMS NI clusters between FreeAXP and real Alpha and Itanium hardware have been successfully created and are stable.

5.1 VMS 6.2 IMAGE BACKUPS

To create a proper system disk image backup under V6.2, it is necessary to issue the BACKUP command with the /NOALIAS qualifier. BACKUP/IMAGE without /NOALIAS does not pick up the VMS\$COMMON directory or its contents.

These commands properly copied and restored the VMS\$COMMON directory under VMS 6.2.

Image Backup Command

```
$ BACKUP/IMAGE/NOALIAS/IGNORE=INTERLOCK DKA200: MKA600:SYSTEM.BCK/SAVE
```

Image Restore Command

```
$ BACKUP/IMAGE MKA600:SYSTEM.BCK/SAVE DKB500:
```

5.2 FLOATING POINT VALUES

We have run extensive tests against the VAX and IEEE floating point instructions. We are aware of only two minor deviations under FreeAXP from the behavior of real AlphaServer 400 hardware.

1. With IEEE floating point instructions, the least significant bit of the fraction may differ between the FreeAXP and a real AlphaServer 400. We believe this is due to a rounding difference. There should be very few applications where this would matter.
2. After an overflow occurs in a multiplication or division instruction, the result (which is invalid either way) differs between FreeAXP and a real AlphaServer 400. As the overflow condition is properly signaled, this should not be a problem for a well-behaved application.

5.3 OPENVMS CLUSTERING

- FreeAXP Beta 1.0.5.261 provided updates to the emulated NIC that allow stable OpenVMS clusters made up entirely of FreeAXP systems.
- FreeAXP Beta 1.0.5.261 and subsequent releases support satellite boot into a cluster.

5.4 OPENVMS 7.1

FreeAXP 1.0.6.269 resolved the OpenVMS 7.1 console access issues. OpenVMS can be built and booted normally under FreeAXP.

5.5 OPENVMS 6.2 & 7.0

FreeAXP 1.0.6.271 resolved OpenVMS 6.2 and 7.0 install and boot issues. VMS systems running OpenVMS 6.2 thru 8.4FT are now supported by FreeAXP.

6. PROBLEM SUBMISSION

If a problem is encountered, seek help at the [FreeAXP Support Forum](http://www.freeaxp.com/forum/):

http://www.openvmshobbyist.com/forum/viewforum.php?forum_id=163

When posting a problem report, the following information is helpful:

- 1) FreeAXP configuration file (.cfg)
- 2) FreeAXP log file (.log)
- 3) FreeAXP Virtual Layer Console (VLC) contents
- 4) Host System Information
 - a) Windows O/S
 - b) Hardware information:
 - i) CPU Type
 - ii) Number of CPU's
 - iii) Memory Installed

6.1 LOG FILE RETENTION

FreeAXP retains up to 6 log files. It uses a version number appended to each log file name to retain the last five log files.

Current Log: .log
Previous Log: .log;-1
Oldest Retained Log: .log;-5

6.2 TIP: CAPTURING CONSOLE INFORMATION

Two changes to the PuTTY console configuration are useful when capturing error information:

- 1) Under Change Settings> Window modify "Lines of scrollbar" to 20000. PuTTY then retains 20,000 lines of history in the scroll back buffer.
- 2) Under Change Settings> Sessions select "Never" for "Close window on exit". This preserves the PuTTY console window if the emulator crashes.
- 3) Once these changes have been made, highlight "Default Settings" under the Saved Sessions box and click the [Save] button. PuTTY will then retain the setting for future console sessions.