Setting Up An AWS 95 Server For ORACLE7 for A/UX (10/93)

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TOPIC ----------

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DISCUSSION ----------

Setting Up An AWS 95 Server For ORACLE7 for A/UX Desktop
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This bulletin explains how to configure an Apple Workgroup Server (AWS) 95 (running A/UX 3.0.1) for use with the product "ORACLE7 Server for A/UX version 7.0". This document contains information which details steps to follow before installing any Oracle software.

Note: This document describes the installation process for A/UX 3.0.1. The process will most likely be different with future versions of A/UX.

This document does not assume that the reader has UNIX experience, but it does assume that the reader has basic Macintosh experience.

Conventions used in this Bulletin
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* Directories: On the Macintosh, people are familiar with folders. Every Macintosh (running the English language) has by default a folder named "System Folder". A file can be referenced by a full path description. An example path on a Macintosh would be: "Macintosh HD:Word Processing:My Letter". This path would refer to a file named "My Letter", in the "Word Processing" folder of the disk named "Macintosh HD".

  Under A/UX's Macintosh environment, the hard disk is

named "/". Under A/UX, and example path would look like: "/:Word Processing:My Letter"

On UNIX, people are familiar with directories. All directories are inside the root directory, "/". An example path would be "/users/oracle/dbs /initSAMP.ora".

* Userid: A userid is an account on a UNIX machine. To log into a UNIX machine, you must provide a username and the appropriate password. Once you have logged into a UNIX machine, you have access to all of the programs and files to which that userid has access.

The superuser, "root", has access to all files and programs. Be very careful when you are logged in as that user.

* Processes: A process is a running image of an executable program. On the AWS 95, you can run 300 processes at once by default. Before you log in, A/UX already has several processes active, performing system functions.

When you run the CommandShell application (or telnet to the AWS 95), a shell process is started to accept the commands you type. If you run a UNIX program, a separate process is created for that program, and will run until it exits or is killed.

On UNIX systems, some programs and files are accessible only by certain users. In general, a process runs with the same permissions as the user who created it. If you set the setuid bit on a program, no matter who runs the program, the process will run with the same permissions as the owner of the program. Some Oracle programs must run with the setuid bit set.

Sometimes processes on UNIX machines will get into a state where they will never exit on their own, and will need to be killed by the system administrator.

* Shell: A shell is a program that looks at the commands you type, and performs the appropriate tasks. There are several shells available on A/UX, each with different features. The root user uses the Bourne shell (/bin/sh). All of the other users use the C-shell (/bin/csh). The different shells have different command languages, so some commands will work in one shell and not others. Each user has a default shell which A/UX will run when they log in.

The shell is run each time you bring up a new window in the CommandShell application.

* Arguments — an argument is an option that you can specify at the time you invoke a UNIX command that affects the way that command behaves. When you read the description of a UNIX command, it will list the various options available. If you were interested in the -a, -b, and -c options, you could use the command "some_command -a -b -c" or "some_command -abc".

* Environment — An environment is a set of variables and their values. You can view the current environment with the command 'env'. From time to time, you will need to set environment variables to have different values.

* Path — A path is a list of directories where UNIX will look for an executable program. Any command which is not a shell command will be looked for in each of the directories in the path. People usually add the directory which contains the oracle programs to their path to have access to the oracle tools.

* TextEditor — On UNIX machines, you will often have the need to edit text files. People who are familiar with UNIX tend to prefer 'vi' which is a standard UNIX text editor. People who are familiar with the Macintosh tend to use the Macintosh-based "TextEditor" from the Macintosh environment of the AWS 95. Text Editor is located in "/:Applications" and behaves much like TeachText, except you can edit multiple documents at a time.

  You may log in to the console of the AWS 95, and simply double-click on a text file to bring up TextEditor to edit that file.

* Commando — The term Commando refers to the way A/UX brings up a dialog box with a Macintosh interface to common UNIX commands. You do not need to know anything about Commando except that it is there, and can make your life a lot easier. You must be logged into the Macintosh environment of the AWS 95 for this option to be available. You can also bring up the Commando interface from within the CommandShell by typing a command, and hitting command-K instead of enter.

The Workgroup Server 95

The Apple Workgroup Server 95 (AWS 95) is a Macintosh Quadra 950 with special hardware additions, and an enhanced version of the UNIX operating system, A/UX 3.0.1.

The AWS 95 has a PDS (Processor Direct Slot) card on its motherboard. This

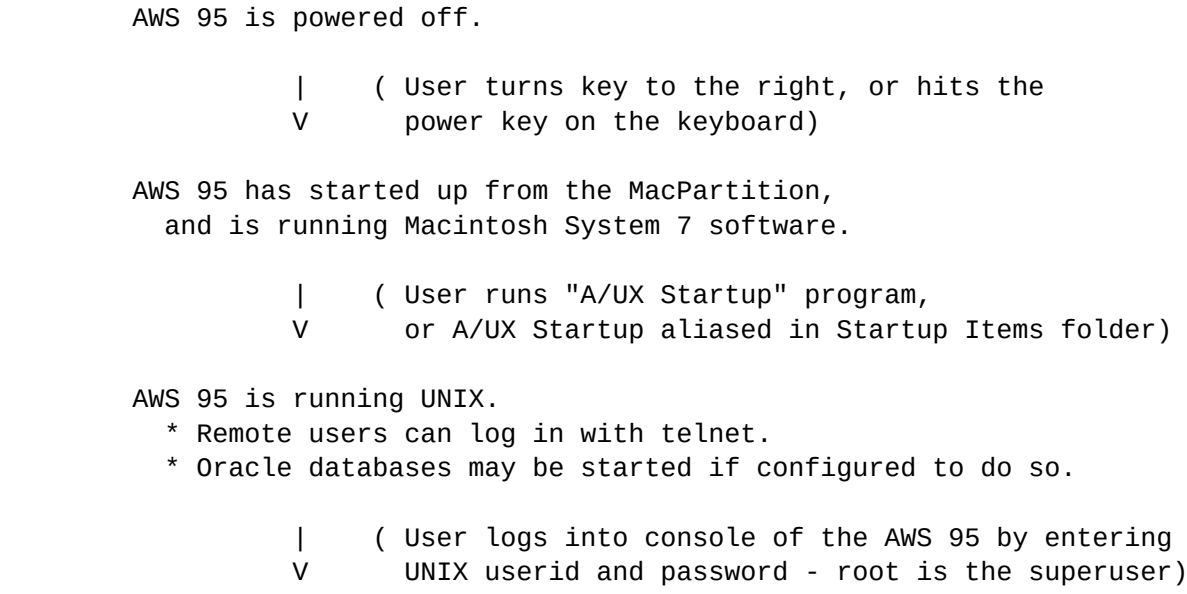
card provides faster access to the main memory by using a static RAM cache. The PDS card also provides two extra SCSI buses which are capable of DMA (Direct Memory Access). These two extra SCSI buses are significantly faster than the buses on the motherboard of the machine, and should be used for the drives that contain the database files.

A/UX 3.0.1 is a mix of System V release 2 UNIX, and the Macintosh System Software. When the machine first boots, it reads a Macintosh Partition of the boot disk, and loads the standard Macintosh operating system. A/UX 3.0.1 is then launched by a program called "A/UX Startup". The "A/UX Startup" application unloads the Macintosh operating system and loads in the UNIX operating system. This process is usually automated by placing an alias to the "A/UX Startup" program into the "Startup Items" folder of the System Folder on the Macintosh Partition.

Once the AWS 95 is started under A/UX, there will be a dialog box to log in. When A/UX is first installed, you can log in with the username 'root' with no password. Once you have logged in, the AWS will look like a normal Macintosh. You can then run normal Macintosh applications, including Oracle tools that can connect to the UNIX-based database.

When you are logged in to the console (actually sitting at the machine) and using the AWS 95's Macintosh environment, the AWS is allocating UNIX memory to run the Macintosh environment. You can adjust the amount of memory allocated to this finder environment by adjusting the Virtual Memory size, under the Memory Control Panel. When logged in as root, choose "Control Panels" from the Apple menu (the picture of the apple in the upper-left corner of the screen). Then you can double-click on the Memory icon. You will see a setting called "After Logout" which has arrows to change the number. By default this is set at 16 Megabytes. If you do not intend to run large applications in the Macintosh environment of the AWS, then you can safely set the size down to 8 Megabytes.

The AWS follows this chain of events when it starts up.



AWS 95 is running Macintosh Finder under A/UX
  * User can now run Macintosh applications, like Oracle Tools.
  * User can now insert and mount CD-ROM disks, allowing her/him
     to run the A/UX Installer from the ORACLE7 CD Install.
  * The AWS is now running like it should be for day-to-day use.

          | (User chooses Logout from the Special menu)
          V

AWS 95 is still running UNIX, but memory used by the Macintosh
  environment has been freed, allowing more memory to be used
  by other services, like the Oracle database(s).

 | (User chooses | (* WARNING -- this is an emergency measure:
 | Shutdown from | User turns key to the left.
 | Special menu) | This forces powerdown of the AWS 95.
 | | If it still does not power down, try
 | This is normal. | hitting button with the triangle on it.
 | |
 V   V

AWS 95 is powered down.

Installing A/UX on the AWS 95

A/UX is usually installed on the AWS 95 when it arrives from Apple. You MUST install another option before you can successfully install the Oracle7 Server for A/UX.

To Install A/UX:
  * Power down the AWS 95.
  * Insert the floppy disk labelled "Apple Workgroup Server 95
     Installation Boot Disk"
  * Insert the CD-ROM disk labelled
     "System Software Installer Database Service Environment"
  * Power up the AWS 95.

An A/UX installation consists of 3 parts:
  * Disk Setup
  * MacPartion A/UX Startup Files
  * A/UX Software Setup

  You will want to do custom installs on Disk Setup and A/UX Software
  Setup. You can do an Easy Install of the Macintosh System Software
  Setup.

  ** Disk Setup

      You must partition each of your hard disks for use with A/UX.
      There are several kinds of partitions, and each partition of a disk

must have a "Slice Number" assigned to it.

These are the types of slices, and their common uses:

* MacPartition
  This is a small portion of the startup disk (4 Megabytes) that holds a small System Folder. Don't worry about making this partion any larger, as it only needs to be 4 MB to startup A/UX.

  *** When you log into A/UX to run the Macintosh environment,
  *** A different System Folder is used. If you want to use any
  *** system extensions on your AWS 95's Macintosh environment,
  *** you need to place them in /:mac:sys:System Folder.

* Root (Slice 0)
  Has the UNIX operating system -- must be present to start A/UX. If this file system is "dirty", A/UX will not start.

* Swap (Slice 1)
  This is a partition which makes up swap space. The UNIX kernel (name for the core of the UNIX operating system) uses swap space to complement the physical memory on the machine. A/UX can move processes from physical memory (RAM) to disk (swap) to make room for other processes. NEVER try to put a filesystem on a swap partition.

    *** Note: Shared memory cannot be swapped out of main memory
              The ORACLE7 SGA uses shared memory. This is discussed
              in greater detail in part 2 of this bulletin.

* Usr (Slice 2)
  This is a UNIX filesystem which can be mounted on a directory, and used for UNIX files. When you create a Usr slice using the program "Apple HD SC Setup", it automatically puts a BSD 4.2 filesystem on the partition (which is the equivalent of running newfs).

* Free (Slice 3 or higher)
  This is a partition with no filesystem on it. It cannot be mounted unless a filesystem is built on it using newfs (BSD 4.2) or mkfs (System V)

  A/UX supports two kinds of filesystems-- BSD 4.2 and System V. It is more convenient to use BSD 4.2 filesystems, because they support longer filenames. BSD 4.2 filesystems are the default.

* Database Partition
  This is a partition of the disk with no filesystem on it. You can configure the A/UX kernel to allow the ORACLE7 database to write directly to database partitions. Using raw database partitions can provide better performance, as the rdbms can bypass the UNIX file buffers. The drawback is that you also bypass the convenient mechanisms for backing up these partitions. Backing up raw partitions is more complex than backing up UNIX filesystems.

*** Warning: Raw database partitions are more difficult to back
***   up, and require familiarity with UNIX administration.

You can choose a custom partitioning scheme that best suits your needs. On a machine with a single 1 Gigabyte hard disk, you might choose the following partition scheme:

Note: 1 MB is 1 Megabyte, which is 1024K. If you are trying to figure out how many megabytes are available on a partition, remember to divide by 1024 (NOT 1000). A partition with 1,000,000 K is actually only 976 MB. This becomes important when you are adding datafiles to the Oracle database.

```
Mac Driver         16 K   (This is required)
MacPartition        4 MB
Swap (Slice 1)     50 MB
Root (Slice 0)    120 MB
Usr  (Slice 2)    825 MB
```

In this scheme, the database files and executables will be placed on the UNIX file system on slice 2. This leaves the A/UX operating system on its own slice 0. It is a very good idea to keep the database on a separate filesystem from the operating system. If the Server ever crashes while the rdbms is running, having the rdbms on a separate filesystem makes the server more likely to start up properly.

Also note in this scheme we did not use Raw database partitions.

In the process of partitioning disks, it is a good idea to keep a notebook where you write down all the information for every slice of every hard disk.

The AWS 95 has 4 separate SCSI buses. For each hard disk and tape drive, it is important to know the bus number and the SCSI ID. Below is a listing of the scsi buses.

	Bus	ID	
	Internal Motherboard	1	
	External Motherboard	2	
*	Internal Cache Card	3	(This is the primary bus)
*	External Cache Card	4	(Good place for CD-ROM and HD's)

  * Indicates that the bus is significantly faster. These buses are connected to the cache card in the AWS 95. These buses are capable of DMA (Direct Memory Access). The Fast external port is the 5th slot from the bottom of the machine. The Slow bus is the 25-pin connector on the right side of the back of the machine, on the edge.

It is important to know the bus and SCSI ID of your hard disks so you

can configure your system to use those disks. A slice of a hard disk is referenced by a file in the /dev/dsk directory.

/dev/dsk/cX0Yd0sZ is the generic format for a slice, where:
X refers to the bus number, and
Y refers to the SCSI id, and
Z refers to the slice number.

Examples:
/dev/dsk/c300d0s2 (Usr slice 2, on SCSI id 0 of fast internal bus)
/dev/dsk/c401d0s2 (Usr slice 2, on SCSI id 1 of fast external bus)
/dev/dsk/c302d0s4 (Raw partition 4, on SCSI id 2, of fast internal)

You will need this information when you write the file /etc/fstab, which is necessary to access more than the default root filesystem. This information is also necessary if you intend to use raw database partitions.

** MacPartition A/UX Startup Files

The default Easy Install options for the MacPartition A/UX Startup Files are fine.

** A/UX Software Install

You ** MUST ** perform a CUSTOM install of A/UX to enable the options which are REQUIRED for Oracle7 Server for A/UX

It is a good idea to install at least all of the following options:

* Core A/UX System
* More UNIX Utilities
* Networking Capability
* Network Server Capability
* Manual Pages
* Basic C Programming
* Debugging and Version
* Extended C Programming

If you like, you can install every option, and they do fit comfortably in a partition that is 120 MB.

Post Installation Tasks

* Once the install is complete, the machine will restart, and the CD will be ejected. The machine will boot up to a point where it prompts you to log in.

* Log in with the userid root.
  YOU MUST BE ROOT TO PERFORM THE NEXT SET OF TASKS.

* Choose "Control Panels" from the Apple Menu, and double-click on the "General Controls" control panel. Set the date and time and close the control panel.

  *** It is important to have the date and time set properly before you
  *** run Oracle databases.

* Filesystem Setup:

  You need to set up your machine to mount the filesystems that were created when you partitioned the hard disks. When an A/UX machine boots up, it attempts to mount any filesystems that are listed in the /etc/fstab file. Initially, the fstab file has one entry:

```
/dev/dsk/c300d0s0       /       ignore  rw      1 0
```

  The first three columns are the ones which are important:

  /dev/dsk/c300d0s0 This is the disk device file to be mounted. This particular entry refers to Slice 0 of SCSI ID 0 of SCSI bus 3, which is the fast internal bus. (See the Disk Setup section above for more info.

  / This describes where to mount the filesystem. In this case, the slice is being mounted as the root of the filesystem. Other directories could be used as well, like "/data, "/oracle", or "/u1".

  ignore This is the type of filesystem to be mounted.

  * ignore means that the device should not be mounted ignore is used for the / partition, as the fstab file itself is on the / partition, so the / partition must already be mounted if the file is being read. ignore is useful as a placeholder in the file.

  *** 4.2 means that the filesystem is the default BSD 4.2 file system created by either newfs, Apple HD SC Setup, or the A/UX Install process.

  *** The Oracle software requires 4.2 filesystems,
  *** as the names of some files exceed the limits of
  *** System V (5.2) filesystems.

  * 5.2 means that the filesystem is a System V filesystem. A/UX machines do not normally use these.

* nfs means that the filesystem is actually on an NFS server. NFS is the Network File Service, which allows machines to mount filesystems which are on other machines that are acting as NFS servers.

rw — This specifies a readable and writable filesystem, which is what you want.

1 0 — These parameters affect the checking and backing up of the filesystem, and generally do not need to be changed.

You will need to add an entry for each filesystem other than '/' that you intend to use. Before you mount a filesystem, you need to choose a directory to mount the filesystem on.

Example of setting up a filesystem

It is convenient to make directories in / which follow a consistent naming scheme. For the first filesystem, you could call it 'u1', or any other name you come up with. The name is not important, as long as you use a consistent naming convention.

*** Note: DO NOT MOUNT FILESYSTEMS on the directory called " Shared
*** Data" because the Oracle database will not be able to handle
*** directories with the spaces in their names.

While logged in to the console of the AWS 95 in the Macintosh environment, you could double-click on the '/' disk icon, and then choose "New Folder" from the File menu. You could then type in the name for the new directory, like 'u1'. At this point you will have created a directory on which you can mount a filesystem.

Then you need to remember what disk file corresponds to the filesystem you want to mount. /dev/dsk/c300d0s2 would be the Usr slice 2 of the hard disk at SCSI ID 0 on bus 3. The filesystem is probably a BSD 4.2 filesystem (this is discussed above), so the filesystem type is 4.2.

You would then add the following line to the file and save the file.

```
/dev/dsk/c300d0s2       /u1     4.2     rw      1 0
```

You can use the A/UX command '/etc/fsentry' to automate the editing of the fstab file. If you type the command from the UNIX prompt, it will ask you a few questions. If you double-click on the fsentry icon, you will be presented with a Commando dialog box with your options. In either case, fsentry will add a line to the /etc/fstab file, and mount the newly entered filesystem.

At the UNIX prompt, type the following command:

df -B (The -B must be a capital 'B')

You should see output like this:

```
Filesystem        kbytes    used   avail %used  Mounted on
/dev/dsk/c0d0s0   140519  119247   14246   89%  /
```

This means that you have only one filesystem mounted. It is mounted on /, and it is almost full (89%).

To mount any filesystems you added to the /etc/fstab file, use the following command:

mount -a

If you see nothing happen that means that it completed successfully, and that all filesystems listed in the /etc/fstab file are mounted. If errors reported, you may have made an error identifying a slice of a disk, or entered a mount point that is not an available directory.

Now the 'df -B' should list several filesystems.

```
Filesystem        kbytes    used   avail %used  Mounted on
/dev/dsk/c0d0s0   140519  119247   14246   89%  /
/dev/dsk/c300d0s  637015      12  637003    1%  /u1
```

In this case, the / filesystem is almost full, and does not have enough room to install an Oracle database. The filesystem mounted on /u1 has over 600 megabytes available, and would be a good place to install the Oracle database. When you run the A/UX Installer to install the database on the server, make sure you are installing in a directory which is in a filesystem with enough available space. In this case, I could make a directory called oracle in /u1, and install the database there.

Note: The sample Oracle installation requires 60 megabytes of space.

* UNIX kernel configuration to enable networking:

If you intend to use TCP/IP, you must configure the UNIX kernel to do so.

If you are only using SQL*Net AppleTalk (and not TCP/IP), you do not need to reconfigure the UNIX kernel, and you could skip this section.

Before you attempt this, you need to make sure that no one else is using the machine, and that you have the following information:

  * IP address (A series of 4 numbers, separated by periods (.) that identifies the machine on the network. Also called an Internet address. This unique number is assigned by your network administrator, and must not be used by any other machine on the network. An example

address would be 128.20.2.17.)

* Hostname (A name for the machine on the network. This is different from the "Macintosh Name" in the "Sharing Setup" control panel. Hostnames cannot have punctuation characters in them. Example hostnames would be "squid", "aws95", or "saleserver".)

* Domain name (On larger networks, domains may be defined. Most universities, government agencies, and larger companies are on the Internet. This large network is divided into domains. Example domain names would be "us.oracle.com" or "cs.some_college.edu". It is useful to know this information, but it is not required.
*** Note: This has nothing to do with AppleTalk Zones.)

* Subnet Mask (A series of 4 numbers, separated by periods (.) that tells the machine how to broadcast information to the network. Your network administrator should give you this information, as an error in this parameter can cause problems for your machine and others on the network. The most common masks are 255.255.0.0 and 255.255.255.0. It is extremely rare that a digit in the mask is anything but 255 or 0.)

* NIS Domain (Your site may use NIS (Network Information Services), previously known as yp (Yellow Pages). This is not required, and will cause problems if not properly configured. NIS allows your machine to ask servers on the network for help resolving symbolic names, delivering electronic mail, and other similar tasks.
*** Warning: If you configure your machine to use NIS and a ypserver is not present on your network, your machine WILL NOT BOOT. If this happens, you will have to rename /etc/ypbind to disable yp.

Once you have this information (and have it written down in your log), you are ready to run the following command:

```
newconfig bnet
```

newconfig will ask you several questions. You give it answers based on the information gathered from your network administrator. In general, when you are asked "Do you want this machine to be an NIS client?", you will answer NO. This avoids the problem described in the warning above.

When newconfig finishes a few minutes later, you should restart the AWS 95 immediately.

Now the A/UX machine has a properly installed and configured operating system, and is ready for an Oracle Installation.

Keywords: <None>

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