

Inter-Office Memorandum

To	CSL	Date	June 16, 1981
From	Roy Levin and Ed Taft	Location	Palo Alto
Subject	Setting up Pilot on a Dolphin or Dorado	Organization	PARC/CSL

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This memo outlines the steps required to install a basic Pilot-based world on a CSL-model Dolphin (sometimes called a "multi-wire" Dolphin) or a Dorado. If you want to do something that appears not to be covered here, consult your local wizard.

Throughout this memo, characters that actually appear on the screen are represented in this font. Additionally, characters that you type are underlined.

Caveats

If you are using a Dolphin, the following initial conditions are assumed:

- 1) You have been using your Dolphin as a virtual Alto, and its Shugart 4000 disk has been organized into two partitions, each configured as a double Diablo-44 file system.
- 2) The second partition of your Shugart disk has no useful files. It will be overwritten by the procedures below. The first partition is assumed to contain vital, irreplaceable information, and will *not* be affected by the procedures below.
- 3) Your Dolphin has "new" EPROMs (i.e., those corresponding to the Mokelumne or later release of Pilot).

If you are using a Dorado, the following initial conditions are assumed:

- 1) You have been allocated one or more dedicated partitions on that Dorado. The procedures below will destroy the previous contents of those partitions and will replace it with a basic Pilot world; the remaining partitions will not be disturbed.
- 2) There do not already exist any Pilot partitions on that Dorado. There can be at most one Pilot file system on each Dorado, though it can span multiple partitions and contain multiple logical volumes (discussed later).

If these conditions don't hold, or if you don't know how your machine is set up, consult your local wizard before proceeding.

These procedures apply to Pilot 6.0 (Rubicon) only, and apply to both Dolphins and Dorados except where noted.

Presumably, you are reading this memo because you want to get Pilot running on your Dolphin or Dorado and you don't want to slog your way through the copious Pilot documentation to figure out how. That's just what it's for. If, however, you find this memo doesn't satisfy your thirst for a

deep understanding of the underlying mechanisms, try going to the well (<Pilot>Doc>). This memo is just a tin cup.

Running Othello

Othello is the Pilot disk utility. It is built on a special version of Pilot that knows to keep its hands off the disk unless specifically instructed to do otherwise. You must terminate each Othello command with carriage return. In the dialogues below, what you type is underlined (except for carriage returns).

- O1. Get into the MesaNetExec.

Type NetExec to the Alto Executive, then type MesaNetExec.

- O2. *Dolphin only*: if your machine is a Dolphin with an LF (wide-screen) display, issue the following command:

```
>SetVersions for germ and microcode
Germ: D0.eg
Microcode: PilotCSLF.eb
```

- O3. Set a switch that tells Othello not to try to bring your Pilot volume on-line, since it doesn't exist yet.

```
>Switches: n
```

This step is required only when running Othello on a machine with a previously unformatted disk.

- O4. Run Othello by typing the following to the MesaNetExec.

```
>OthelloD0.pb (Dolphin), or
```

```
>OthelloDorado.pb (Dorado)
```

The messages "loading germ" and "loading microcode" will appear in the herald, and then the screen will go blank as your Dolphin or Dorado boots. Watch the maintenance panel numbers, which appear on the front panel of a Dolphin and in the middle of the screen on a Dorado. The numbers should run through a sequence like 910, 920, 930, 940, 950, 960, 970, 975, 980, 990. You may not see all of these, but if the machine hangs with some other number in the lights, consult a wizard. Shortly after 990 appears, Othello should announce itself and prompt for input.

```
Othello 6.0 of date
>
```

Formatting the Disk

The format of Pilot disks is not compatible with the format presumed by Alto-based software. However, through the miracle of modern technology, it is possible for a pseudo-Diablo Alto file system and a Pilot physical volume to cohabit a Dolphin's or Dorado's disk.

On a Dolphin, the following procedure will create a Pilot physical volume on the area of your Shugart disk that used to be occupied by Alto partition 2, leaving Alto partition 1 undisturbed. On

a Dorado, the procedure will create a Pilot physical volume spanning one or more partitions whose numbers you specify, leaving the remaining partitions undisturbed.

F1a. On a Dolphin, you first want to alert Othello to the presence of your precious Alto file system.

```
> Reserve Alto Volume
Drive Name: rd0
Reserve space for an Alto volume?: Yes
Number of Model 44's? [1..4]: 2
```

F1b. On a Dorado, you need to tell Othello which partitions are to be occupied by the Pilot file system.

```
> Partitions
Include partition 1 in the Pilot file system? Yes or No
Include partition 2 in the Pilot file system? Yes or No
Include partition 3 in the Pilot file system? Yes or No
Include partition 4 in the Pilot file system? Yes or No
Include partition 5 in the Pilot file system? Yes or No
```

You can include more than one partition in the Pilot file system, and they need not be adjacent; however, if they are adjacent, things will be much simpler later on when you are creating logical volumes.

F2. You are now ready to format the partition(s) for Pilot. *If you haven't salvaged all the files you care about on that region of the disk, now is the time. Boot out of Othello, move the files elsewhere, and start over with step 01.*

```
> Format
Drive Name: rd0
Are you sure? [y or n]: Yes
Are you still sure? [y or n]: Yes
    There is a delay of about 1 minute here (longer if more than one partition).
Creating Pilot volume named "Empty" to hold bad spot table
```

F3. *Dolphin only:* Formatting the disk has wiped out the microcode, so you need to reinstall it. First, login in a manner suitable for talking to Ivy and establish a connection:

```
> Login
User: <your name>
Password: <your password>
> Open
Open connection to Ivy
Ivy (Parc) 1.27, File Server of September 2, 1980; 5 users out of 8
```

F4. *Dolphin only:* Now (re)install the microcode on your disk. *Note: This step assumes that your Dolphin has "new" EPROMs. If it doesn't, get your machine converted before you proceed.*

```
> Initial Microcode Fetch
Drive Name: rd0
File name: <D0>InitialAlto.eb
Are you sure? [y or n]: Yes
Fetching...Installing...done
```

- F5. *Dolphin only*: Close your connection to Ivy. This isn't really necessary, but it is likely to time out before you get to use it again, and closing it will prevent subsequent non-determinism.

```
> Close
closed
```

Configuring a Physical Volume

Your next step is to configure the blank disk area as a Pilot physical volume. Except for this initial configuration process, you rarely have to think about physical volumes. You should read through this section before beginning the procedure.

- P1. You will create a number of logical volumes on the single physical volume. Each of these logical volumes will hold the files for semi-independent Pilot worlds. There is considerable room for individual taste (see the discussion below), but in the early days of Cedar, a modicum of uniformity will make everyone's life a little easier. If you think you have a good reason to diverge from the configuration proposed here, consult a wizard. Don't even change the logical volume names without consulting a wizard.

In the case of a Dorado, the following dialogue assumes you are including only one partition in the Pilot file system (as declared in step F1b). If you are including multiple partitions that are all adjacent, this procedure also applies but the numbers will be larger. If the partitions aren't adjacent, things get more complicated; before proceeding, read the section on multiple-partition file systems (below).

```
> Create Physical Volume
Drive Name: rd0
Shall I try to find an old Bad Page Table?: Yes
New physical volume name: Cedar
Number of logical volumes: [1..6]: 4
Logical volume 0
  Name: Othello
  Pages: [50..22133]: 700
  Type: debugger
Logical volume 1
  Name: Client
  Pages: [50..21483]: 4000
  Type: normal
Logical volume 2
  Name: CoPilot
  Pages: [50..17533]: 12000
  Type: debugger
Logical volume 3
  Name: CoCoPilot
  Note: Othello will suggest an answer to the following question; the suggested value will be the
  maximum possible (i.e., consuming the remaining available space in the physical volume), and may not
  be exactly 5583. You should accept the value suggested by Othello.
  Pages: [50..5583]: 5583
  Type: debuggerDebugger
Are you sure? [y or n]: Yes
```

While this may all seem like gibberish to the unfamiliar user, it need not be mysterious. You are asking Othello to subdivide the space on the physical volume into 4 logical volumes with the indicated names. The Othello volume is not strictly necessary, but it is an occasional convenience

and is only given a small amount of space. The Client volume is the nest in which Cedar will grow. The CoPilot volume is where you develop, compile, and bind your programs. For that reason, it gets the majority of the file space. The CoCoPilot volume is there to help the wizards when CoPilot crashes around your head.

At present, there is no way to alter the distribution of space among the logical volumes without recreating the entire physical volume (and destroying its contents!). Therefore, the initial distribution of space should be carefully considered. In deciding whether to alter the numbers suggested above, you should understand that the raw sizes are slightly misleading; a more useful number is the amount of space remaining after the bare-bones development tools (e.g., Compiler, Binder, Executive) have been installed. Note: these numbers apply to machines with 384K words of real memory. Smaller machines will have more available free space and larger machines less in the CoPilot and CoCoPilot logical volumes (the ratio is 8 pages in each volume per K of real memory). Your mileage may vary.

Client	~900 pages
CoPilot	~7000 pages
CoCoPilot	~800 pages

It might be reasonable to move up to 500 pages from CoCoPilot to either CoPilot or Client, depending upon your needs. Exception: on a machine with more than 384K of memory, no pages may be taken away from CoCoPilot. Similarly, if you anticipate creating substantial files on the Client volume, you might want to pare down CoPilot. Remember, however, that the CoPilot environment is your primary development world and so should retain the bulk of the file space.

It might also be reasonable to eliminate the CoCoPilot volume entirely, freeing its pages for inclusion in CoPilot or Client. In fact, when creating a single-partition Pilot file system, it will be essential to eliminate CoCoPilot if your machine has more than 512K words of real memory.

If you decide to eliminate CoCoPilot, you should know what will happen when CoPilot crashes: the maintenance panel number 915 will appear, indicating that your machine is now in the TeleDebugger. Note: this depends on your having initialized CoPilot in a special way, described below in step L9. To find out what happened, you must run CoPilot on another Dolphin or Dorado (not necessarily the same type of machine as yours), and use the `ReMote debuggee` command to make an Ethernet connection to your crashed machine.

Multiple-partition file systems

As mentioned earlier, on a Dorado it is possible for the Pilot file system to occupy multiple partitions. Pilot doesn't really have any notion of 'partition', but simply treats the entire disk as a Pilot physical volume. However, Othello does know how Alto partitions are laid out, and it arranges to create Pilot logical volumes only on those regions of the disk you specify.

If the partitions to be used by Pilot are adjacent then the space available for creating Pilot logical volumes is all contiguous, and you can subdivide this space into logical volumes however you please. If the partitions are not adjacent then things get more complicated. Due to (temporary) limitations in Pilot, a logical volume must occupy a contiguous region of the disk. Thus, if the available space is not contiguous, each logical volume must be entirely contained within one sub-region.

Othello provides some assistance in setting things up. The procedure is best illustrated by an example:

- F1b. Tell Othello which partitions are to be occupied by the Pilot file system (in this example, partitions 2, 3, and 5).

```
> Partitions
Include partition 1 in the Pilot file system? No
Include partition 2 in the Pilot file system? Yes
Include partition 3 in the Pilot file system? Yes
Include partition 4 in the Pilot file system? No
Include partition 5 in the Pilot file system? Yes
```

F2. (Use normal procedure presented earlier.)

P1. Set up logical volumes on the physical volume.

```
> Create Physical Volume
Drive Name: rd0
Shall I try to find an old Bad Page Table?: Yes
New physical volume name: Cedar
Number of logical volumes: [1..6]: 4
Remaining space is in 2 runs of 45640, 22820 pages.
Logical volume 0
  Name: Othello
  Pages: [50..45640]: 700
  Type: debugger
Remaining space is in 2 runs of 45640, 22120 pages.
Logical volume 1
  Name: Client
  Pages: [50..45640]: 22120
  Type: normal
Remaining space is in 2 runs of 45640, 0 pages.
Logical volume 2
  Name: CoPilot
  Pages: [50..45640]: 35000
  Type: debugger
Remaining space is in 2 runs of 10640, 0 pages.
Logical volume 3
  Name: CoCoPilot
  Pages: [50..10640]: 10640
  Type: debuggerDebugger
Are you sure? [y or n]: Yes
```

At each step, Othello tells you how the remaining space is divided; each additional logical volume can be no larger than the largest of these sub-regions. When you specify a size for a logical volume, Othello applies a "best-fit" algorithm to select a sub-region for it. That is, Othello assigns the new logical volume to the smallest sub-region into which it will fit. You may need to do some advance planning to obtain the desired effect.

Preparing Logical Volumes

Each of the logical volumes created above needs to have a boot file installed on it. This is the program that will receive control when the volume is booted. In addition, certain other files needed for booting (the germ and the microcode) need to be installed somewhere on the physical volume.

In the procedures below, you should systematically replace "m" by "D0" for a Dolphin or "Dorado" for a Dorado.

- L1. Bring your disk to "online" status.

```
> Online
Drive Name: rd0
```

- L2. Establish a connection to Ivy.

```
> Login
User: <your name>
Password: <your password>
> Open
Open connection to Ivy
Ivy (Parc) 1.27, File Server of September 2, 1980; 5 users out of 8

> Directory
Directory: Pilot>m (remember m = D0 or Dorado)
```

- L3. Install Othello and the germ on the Othello volume.

```
> Fetch
Logical Volume Name: Othello
Boot file name: Othellom.boot
Fetching...Installing...done
> Germ Fetch
Logical Volume Name: Othello
Germ file name: m.germ
Fetching...Installing...done
Shall I also use this for the Physical Volume? Yes
```

- L4. *Dolphin only*: Install Pilot microcode on the Othello volume.

```
> Pilot Microcode Fetch
Logical Volume Name: Othello
Pilot microcode file name: <D0>CedarD0.eb
Fetching...Installing...done
Shall I also use this for the Physical Volume? Yes
```

- L5. Install CoPilot on the CoCoPilot volume. If you did not create a CoCoPilot volume, skip this step.

```
> Fetch
Logical Volume Name: CoCoPilot
Boot file name: CoPilotm.boot
Fetching...Installing...done
```

- L6. Install CoPilot on the CoPilot volume.

```
> Fetch
Logical Volume Name: CoPilot
Boot file name: CoPilotm.boot
Fetching...Installing...done
```

- L7. You are now ready to install the Client volume boot file. If you intend to use Cascade, do L7a; otherwise, do L7b.

L7a. Install Cascade on the Client volume.

```
> Fetch
Logical Volume Name: Client
Boot file name: <Cascade>Cascadem.boot
Fetching...Installing...done
```

L7b. Install Tajo on the Client volume.

```
> Fetch
Logical Volume Name: Client
Boot file name: Tajom.boot
Fetching...Installing...done
```

- L8. You have now retrieved and installed all of the files necessary to initialize your volumes. You next specify that the Othello volume is to be booted when you enter the Pilot world from the Alto world (you'll see how to do that shortly).

```
> Close
closed
> Set Physical Boot Files
Logical Volume Name: Othello
Set physical volume boot file from this logical volume? Yes
    The following question is asked only on Dolphins.
Set physical volume pilot microcode from this logical volume? Yes
Set physical volume germ from this logical volume? Yes
Are you sure? [y or n]: Yes
```

- L9. Your logical volumes are now ready to be initialized by booting. If you created a CoCoPilot volume (in step P1 above), do step L9a; otherwise do step L9b.

L9a. Install CoCoPilot and CoPilot normally.

```
> Boot
Logical Volume Name: CoCoPilot
switches: <CR>
```

The maintenance panel numbers will sequence through 910, 920, 930, 940, 950, 960, 970, 975, 980, 990, although you may not see all of them go by. You will then see CoCoPilot initializing itself (creating windows, outload files, herald, etc.). When it has finished, it will boot your Othello volume, setting you up to repeat the procedure for your CoPilot volume.

```
Othello 5.0 of 22-Oct-80 10:25:13
> Online
Drive Name: rd0
> Boot
Logical Volume Name: CoPilot
switches: <CR>
```


- L9b. Install CoPilot with switches that tell it to invoke the TeleDebugger when it crashes, rather than attempting to invoke the (nonexistent) CoCoPilot.

```
> Boot
Logical Volume Name: CoPilot
switches: MR <CR>
```

When CoPilot has finished installing, it will once again boot your Othello volume.

- L10. You now establish the Client volume's boot file (Tajo or Cascade) as the physical boot file.

```
Othello 5.0 of 22-Oct-80 10:25:13
> Online
Drive Name: rd0
> Set Physical Boot Files
Logical Volume Name: Client
Set physical volume boot file from this logical volume? Yes
Are you sure? [y or n]: Yes
>
```

Switching between Pilot and Alto worlds

Dolphin

Your Dolphin is presently configured to boot the Alto world when the boot button is pressed. This can be changed by installing different initial microcode, but you probably don't want to do that just yet. To transfer control from the Alto world to the Pilot world, you need a program called RunPilot, which is stored as:

```
[Iris]<Pilot>D0>RunPilot.bcd
```

Since this is a Mesa program, you also need

```
[Ivy]<Mesa>RunMesa.run
[Ivy]<Mesa>Mesa.image
```

To transfer control to the Pilot world, simply type

```
RunPilot
```

to the Alto Executive. Your Pilot Client volume should boot. If you performed step L7a, Cascade will transfer control to CoPilot, and you should proceed with the installation of Cascade (next section). If you performed step L7b, you should now be in Tajo, and can ignore the remainder of this memo (or do it some other time).

To return to the Alto world, either push the boot button or get the program you are running to perform a boot for you. In Othello, the Quit command performs a boot; in CoPilot or Tajo, invoking the BootButton menu command (by pressing the middle mouse button while pointing into the top window) does likewise. You should not press the boot button while in CoPilot because this substantially slows down subsequent re-entry to CoPilot (and will cause context to be lost if you next enter CoPilot from a client program).

Dorado

At present, the only way to switch between the Alto and Pilot worlds is to boot the Dorado, bringing in appropriate new microcode and starting up the boot file on the appropriate partition. New microcode is ordinarily invoked by holding down an appropriate key and pushing the boot button three times. Microcode is always booted from the Ethernet and therefore need not be installed on your Dorado's disk.

To boot the Pilot world, hold down "T" and push the boot button three times. Within a few seconds, maintenance panel numbers should appear on the screen, and your Pilot Client volume should boot. If you performed step L7a, Cascade will transfer control to CoPilot, and you should proceed with the installation of Cascade (next section). If you performed step L7b, you should now be in Tajo, and can ignore the remainder of this memo (or do it some other time).

To return to the Alto world, push the boot button three times while holding down no keys; this reloads the Alto microcode and boots partition 4. (At present, Othello's Quit command and CoPilot/Tajo's BootButton menu command boot the Pilot world, not the Alto world.) You should not press the boot button while in CoPilot because this substantially slows down subsequent re-entry to CoPilot (and will cause context to be lost if you next enter CoPilot from a client program). To get around this, first boot the Othello volume via the menu obtained by pressing the middle mouse button while pointing into the top window; then press the boot button.

Installing Cascade

Cascade provides a modest development environment based on Pilot. It consists of a simple Executive, a compiler, a binder, and various other utilities that run in the CoPilot environment; and a Pilot boot file for running programs in the Client volume.

The procedures below assume some familiarity with the Tools environment. Users unfamiliar with Tools should read the "Tajo Users Guide," or get someone familiar with Tools to demonstrate.

- C1. If you have not installed *Cascadem.boot* on your Client volume (step L7a above), perform the following steps. Otherwise, simply boot your Pilot world, as described in the previous section, and go on to step C2.

Using whatever means is convenient, get Othello running. (You can boot your Othello volume from Tajo, or use steps O1-O4 above.) Then install Cascade as follows (overwriting Tajo):

```
Othello 5.0 of 22-Oct-80 10:25:13
> Online
Drive Name: rd0
> Login
User: <your name>
Password: <your password>
> Open
Open connection to Ivy
Ivy (Parc) 1.27, File Server of September 2, 1980; 5 users out of 8
> Fetch
Logical Volume Name: Client
Boot file name: <Cascade>Cascadem.boot
Fetching...Installing...done
> Close
```

```
closed
> Boot
Logical Volume Name: Client
switches: <CR>
```

You should now be talking to CoPilot.

- C2. Using the FileTool in CoPilot, obtain the following files:

```
[Ivy]<Cascade>Editor.bcd
[Ivy]<Cascade>Executive.bcd
[Ivy]<Cascade>FTP.bcd
[Ivy]<Cascade>InitThinPilot.cm
[Ivy]<Cascade>User.cm
```

On a Dorado with lots of file space in CoPilot, you may wish to use InitFatPilot.cm rather than InitThinPilot.cm.

- C3. Use the center mouse button to obtain the menu in the herald at the very top of the screen, and use it to boot CoPilot. This will cause CoPilot to reinstall itself, incorporating the Cascade Executive, compiler, and binder. When this process finishes, you will find yourself in CoPilot once again.

- C4. Using the SimpleExec (which will initially be a small box at the right of the screen), type:

```
@InitThinPilot                (or @InitFatPilot)
```

which will bring over numerous files that are useful for program development in the CoPilot environment.

- C5. Edit User.cm to personalize it; at a minimum, insert your own user name. Then boot CoPilot again (step C3) to cause CoPilot to take notice of the changes in User.cm.

- C6. To bring over Cedar-related files, use the SimpleExec to invoke either CedarG.cm or Cedar.cm, depending on whether or not you wish to include the Cedar Graphics package.

```
@CedarG                        (or @Cedar)
```

Miscellaneous

If you move a disk from one machine to another, or any change is made in your machine's hardware configuration (e.g., the amount of real memory changes, or the Ethernet address changes), you *must re-install CoCoPilot and CoPilot*, repeating step L9 of the setup procedure.

Additionally, if the amount of real memory *increases*, the re-installation process will enlarge the outload files on the CoCoPilot and CoPilot volumes; the amount of increase is 8 pages per K of real memory per volume. There must be sufficient free space for this to be possible.