

Plan B: An Operating System for Ubiquitous Computing

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Roadmap

- Problems
- Ideas
- Examples
- Issues & Lessons



Problems

Services and Tools for Perv. Comp.:

- Adding new services
- Combining old and new services
- Building new tools
- Using old tools for new things



The target environment



What do we try to do?

Provide the mechanism

What do we NOT try to do? (yet)

Provide the policies



Antecedents

Plan 9

- (Almost) everything is a file
- Network file system protocol (9P)
- Per-process name spaces



Our approach

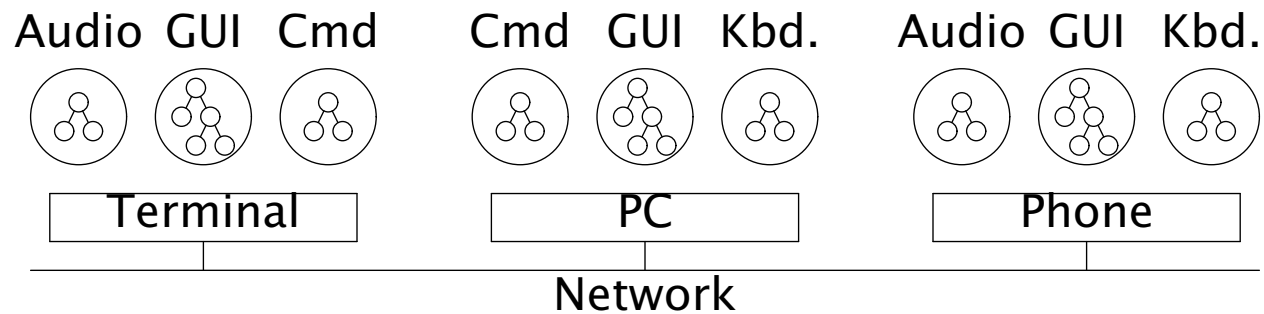
Plan B

- Everything is a file
- Abstract interfaces for resources
- Dynamic import of files

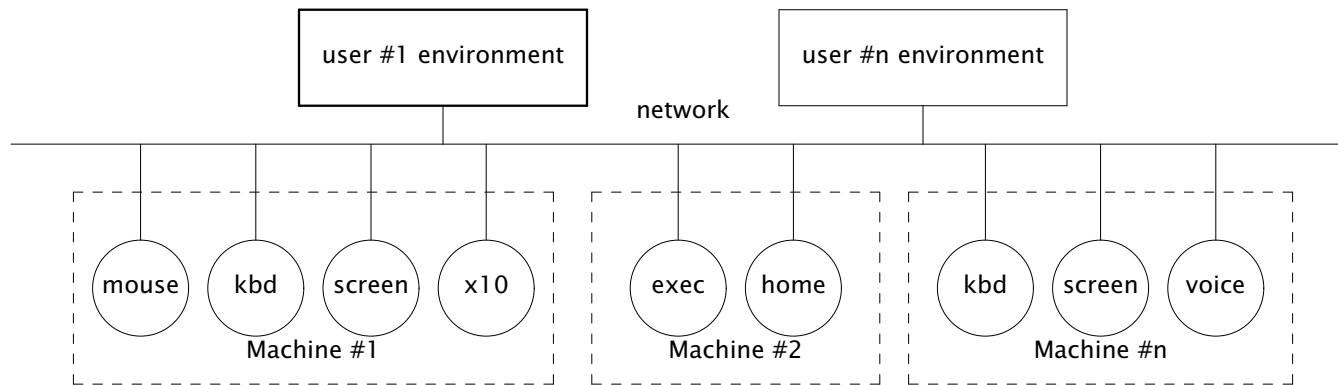


System architecture

A system built out of dynamic vols.



Computing Environment



Computing Environment

How?

```
mount -V /devs/voice!L136!Unemo /voice
```

```
mount -a -V /devs/voice!L136 /voice
```



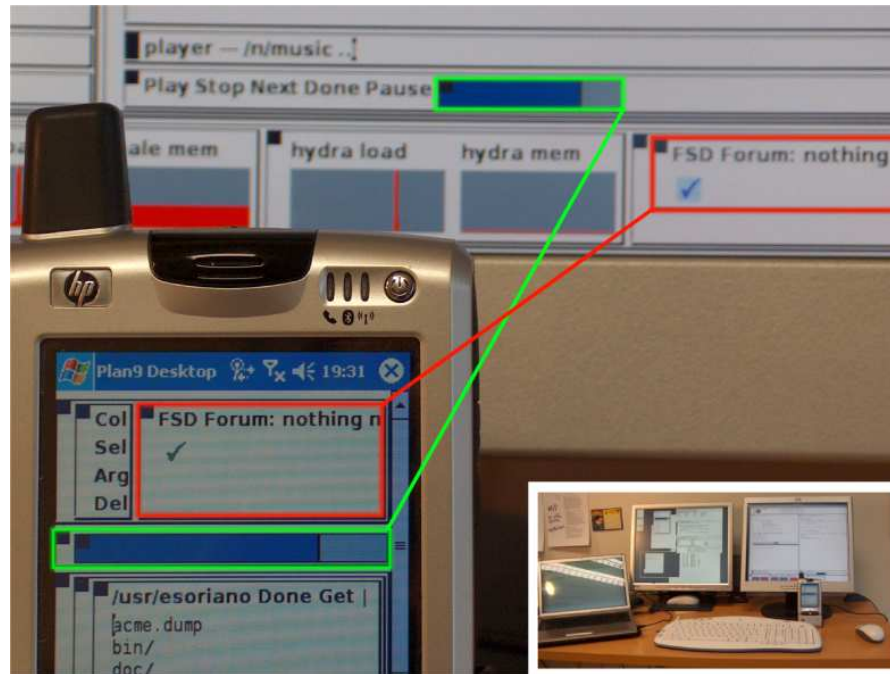
Example: The Plan B player

The screenshot displays a desktop environment with several widgets and applications:

- Top Row:** A vertical menu with options 'Col', 'Sel', 'Arg', and 'Del'. A cartoon fish icon. Three 'Weather' widgets for 'madrid', 'alicante', and 'jaen'. A clock widget.
- Second Row:** 'whale load' and 'whale mem' (empty bars). 'aquamar load' and 'aquamar mem' (red bar charts). 'nautilus load' and 'hydra load' (red bar charts).
- Third Row:** 'atlantis' (nautilus, sargazos, victim). 'pwr:136lamp' (pwr:136light, who:136). 'Mail' (javierb, andresl). 'who' (paurea, sareval).
- Bottom Row:**
 - player** window: `/n/music/mecano/2.Donde-esta-el-Pai`. Controls: Play, Stop, Next, Done, Pause. Playlist:
 01. Donde-esta-el-pais-de-las-hadas.mp3
 02. Este-chico-es-una-joya.mp3
 03. La-bola-de-cristal.mp3
 04. El-amante-de-fuego.mp3
 05. Madrid.mp3
 06. Barco-a-Venus.mp3
 07. La-fiesta-nacional.mp3
 08. Un-poco-loco.mp3
 09. No-aguanto-mas.mp3
 10. Focas.mp3
 11. El-balon.mp3
 12. El-ladron-de-discos.mp3
 - Terminal** window: `/usr/nemo Done Get | oban`. Output: `[usr/nemo fortune 1609] Done |`. Text: `Nobody goes to the theatre unless suffering from acute bronchitis. assert(np);`. Controls: Play, Stop, Next, Done, Pause.
 - oban** window: `oban -`. Status: `B: 0 W: 6.5 T: 0 Playing: W Mode: Edit`. Controls: Play, Bigger, Smaller, Print, Put, Get, Chcol, Undo. A yellow grid with three blue dots.



Example: The Plan B player



Example: The Plan B player

- Audio device:
`/devs/audio/audio`
`/devs/audio/output`
- User interface:
`/devs/xxxui/.../col:player/`
`etc.`
- Music files:
`/n/music/`
- Displaying poster for CD:
`/mnt/plumb/poster`



Example: tell

The Plan B intercom

```
location=`{cat /who/nemo/where}
```

```
mount -V /devs/voice!L$location
```

```
echo hi there! >/devs/voice/out
```



Example: visitors

Automating the environment

```
if (grep yes /where/$location/visits)
  echo 50 >/devs/audio/volume
mkdir /devs/wallui/row:guest
chown guest /devs/wallui/row:guest
echo welcome >/devs/voice/out
```



Example: Zip'ing a room

- Store room UIs, lights, volume

```
mount -V /devs/ui!L$location  
mount -V /devs/x10!L$location  
mount -V /devs/voice!L$location  
cd /devs  
tar c *ui x10 voice >/tmp/room.tar
```

- Unzip'ing a room

```
tar xf /tmp/room.tar
```



Complexity

Tools and services get easy:

- hxfs: 734 lines of C
- voicefs: 387 lines of C
- clock: 98 lines of C
- player: 482 lines of C
- tell: 26 lines of shell
- setvol: 38 lines of shell



Issues

Aliens, mostly.

- Need a Plan B to adapt
- Low-level interfaces



Questions?

More information via our httpd

<http://lsub.org>



...we call our logo “The fish”

