Arla for Windows 2000

Magnus Ahltorp
Royal Institute of Technology
ahltorp@nada.kth.se

Love Hörnquist-Åstrand
Royal Institute of Technology
lha@nada.kth.se

Assar Westerlund
Swedish Institute of Computer Science
assar@sics.se

Summary

- Introduction to AFS
- How Arla works
- Inner working of Windows
- Porting Arla to Windows
- When will it be ready?

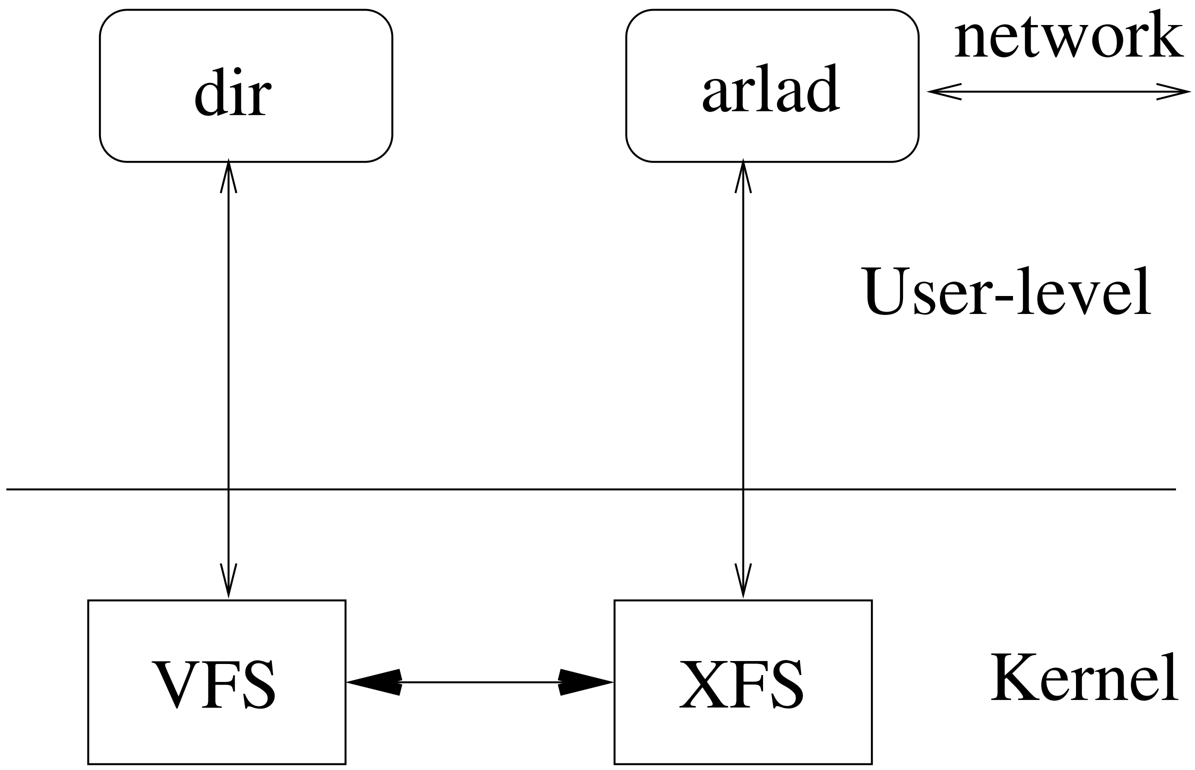
Introduction to AFS

- distributed file system
- world-wide
- ~ 230 public cells
- global name-space
- location-transparent
- working solution

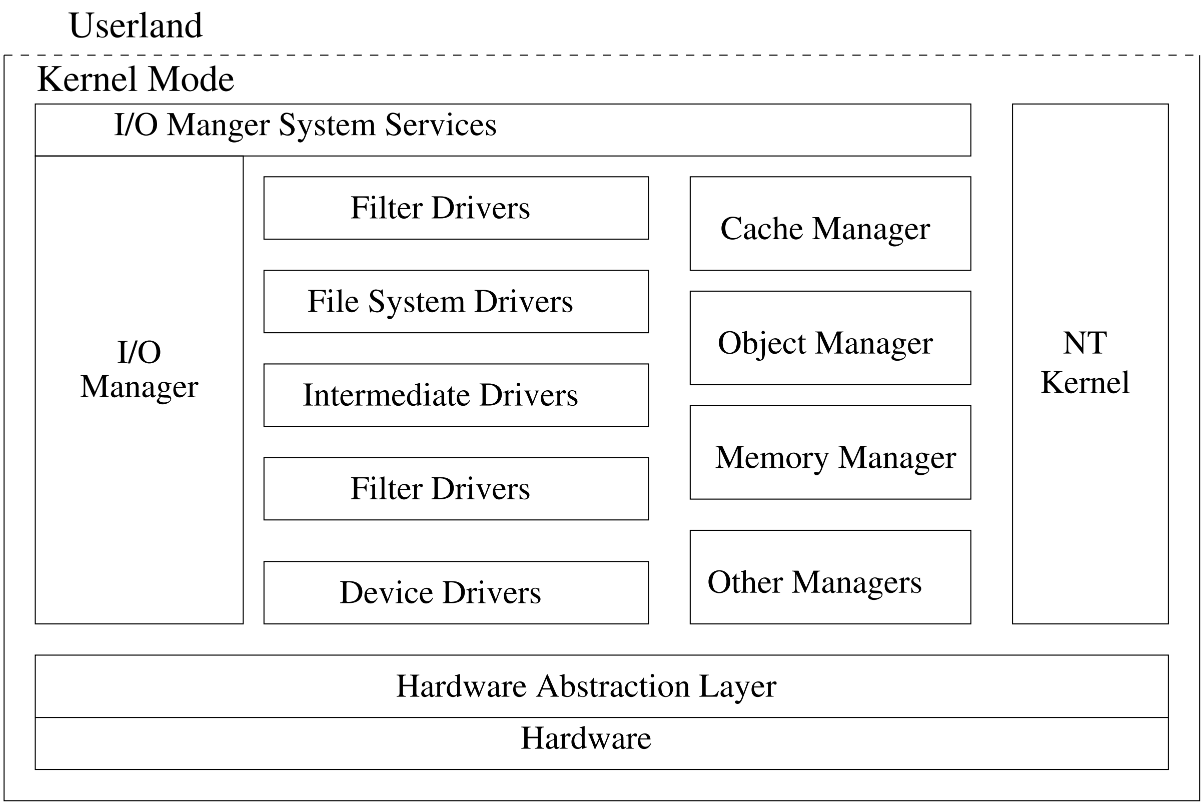
Arla

- free AFS client
- available for most Unix systems
- fairly easily ported
- encryption, disconnected mode, . . .
- more advanced features being hacked on

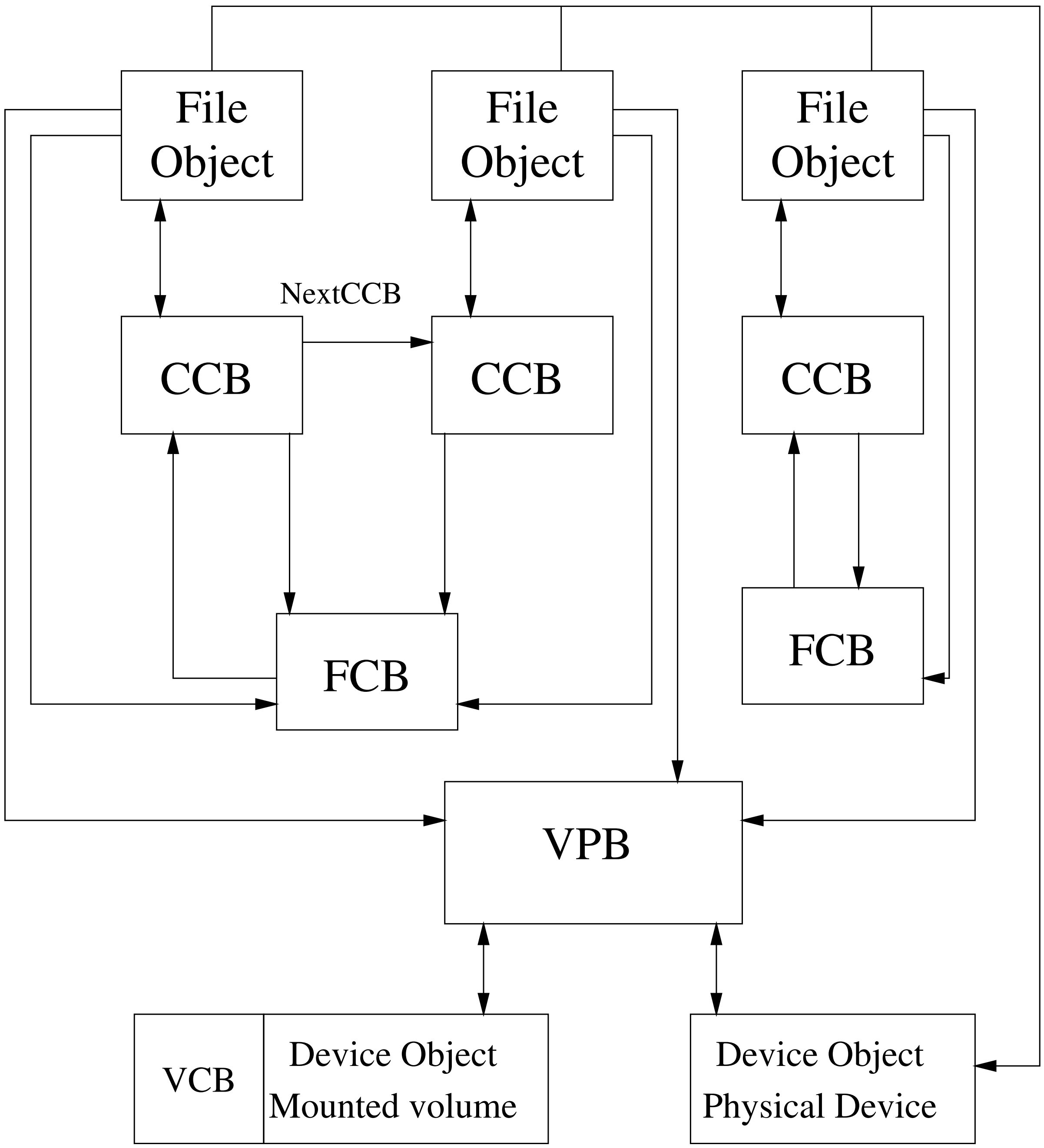
Arla architecture



Simplified overview of NT kernel



File systems in NT



Porting Arla to NT

- cygwin
- threads
- user-level
- kernel development
- kernel-arlad communication
- other issues

Cygwin

- Unix-emulation layer for Windows
- basically a complete libc
- useful for porting arlad
- some bugs and issues had to be resolved

Threads

- pthreads (almost in Cygwin)
- Windows threads
- LWP threads
  - C + assembly function
  - on top of pthreads
  - on top of windows threads

User-level

- with cygwin + working threads
- "user-mode arlad" works
- command-line test program
- can read files and walk tree

Kernel Development

- NTDDK
- IFS-kit
- "GNU IFS-kit"
- WinDBG (over a serial line)
- kd

Kernel-userspace communication

- under Unix via a character device
- relies on select
- select only works with sockets on Windows
- helper program that forwards request/replies

components

- arlad — daemon
- helper process
- xfs — file system driver (kernel module)

Other issues

- GUIs and mount points
- `/afs` contains lots of cells
- programs are trying to fetch status of all
- arlad makes up status
- fetches them when needed

Conclusions

- source code in proper amount helps
- you will crash lots of times
- figuring out why things break is hard
- kernel development on NT is time consuming

Status

- more work is obviously needed
- time is the limiting factor
- for arlad the work is done

Arla 0.33.1

- Linux (2.2 and 2.3)
- Net, Free, OpenBSD
- Solaris 2.5 - 8
- MacOSX/Darwin

Some support:

- Windows NT
- Digital Unix/Tru64/OSF1/whatever
- Irix
- AIX
- HP-UX
- SunOS

Stuff

- client (file manager)

- tools:
  - fs
  - pts
  - vos

Cache manager

- caches whole files
- allows reading of files in disconnected mode
- some support for writing in disconnected mode

In progress

- caching in blocks
- File server (milko)
- Volume Database server
- Protection Database server

References

- `http://www.stacken.kth.se/projekt/arla`