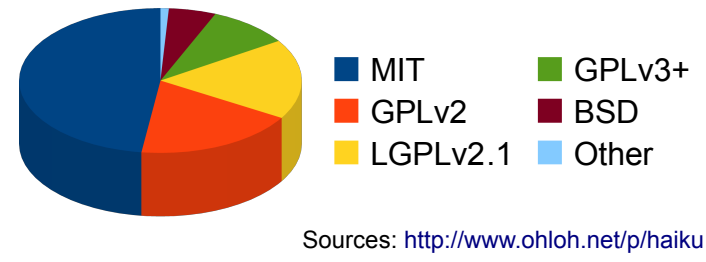


HA I K U

Francois.Revol@imag.fr

1. Introduction

- Operating System
- OpenSource
 - MIT licence
- Desktop-focused
- Designed from scratch
 - But leverages more than 40 existing OpenSource projects
 - Coherency from kernel to GUI
 - KISS: Keep It Smart & Simple
- Started 2001 as OpenBeOS
- First alpha release sept. 2009
 - 104000 downloads
- 45 committers, ≥90 contributors

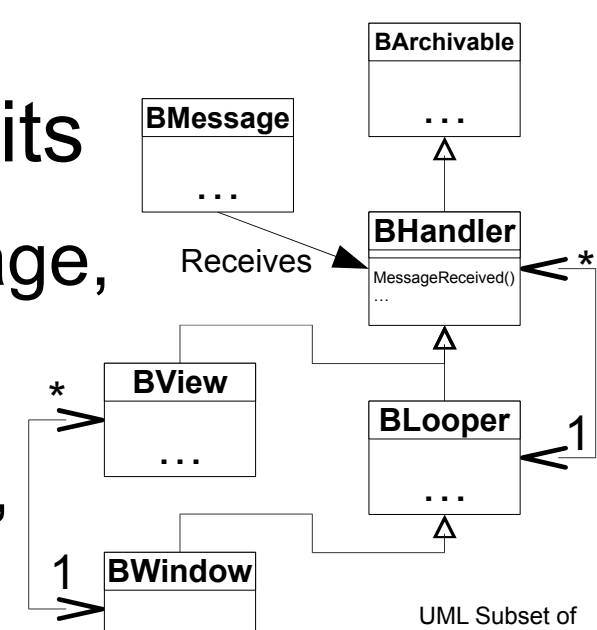
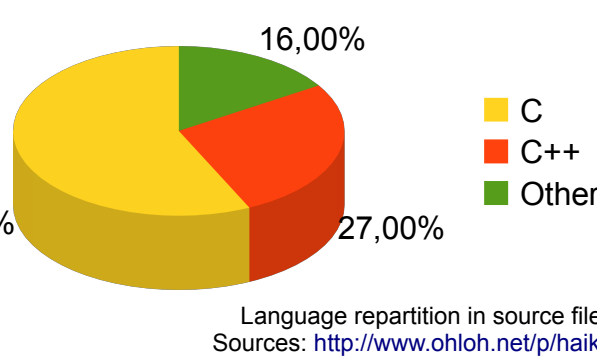


2. Missing & Reused parts

- Still in development
 - Live sample of full OS evolution
 - But still human size
 - More appealing practical work!
 - Google Summer of Code
 - *PPC & ARM port, Gallium3D...*
- Missing parts
 - Leaves room for experimentation
 - *IPv6, Java, power management, full multiuser...*
- Reused software projects
 - Demonstrates integration of foreign code
 - *FFmpeg, FreeType, MESA...*

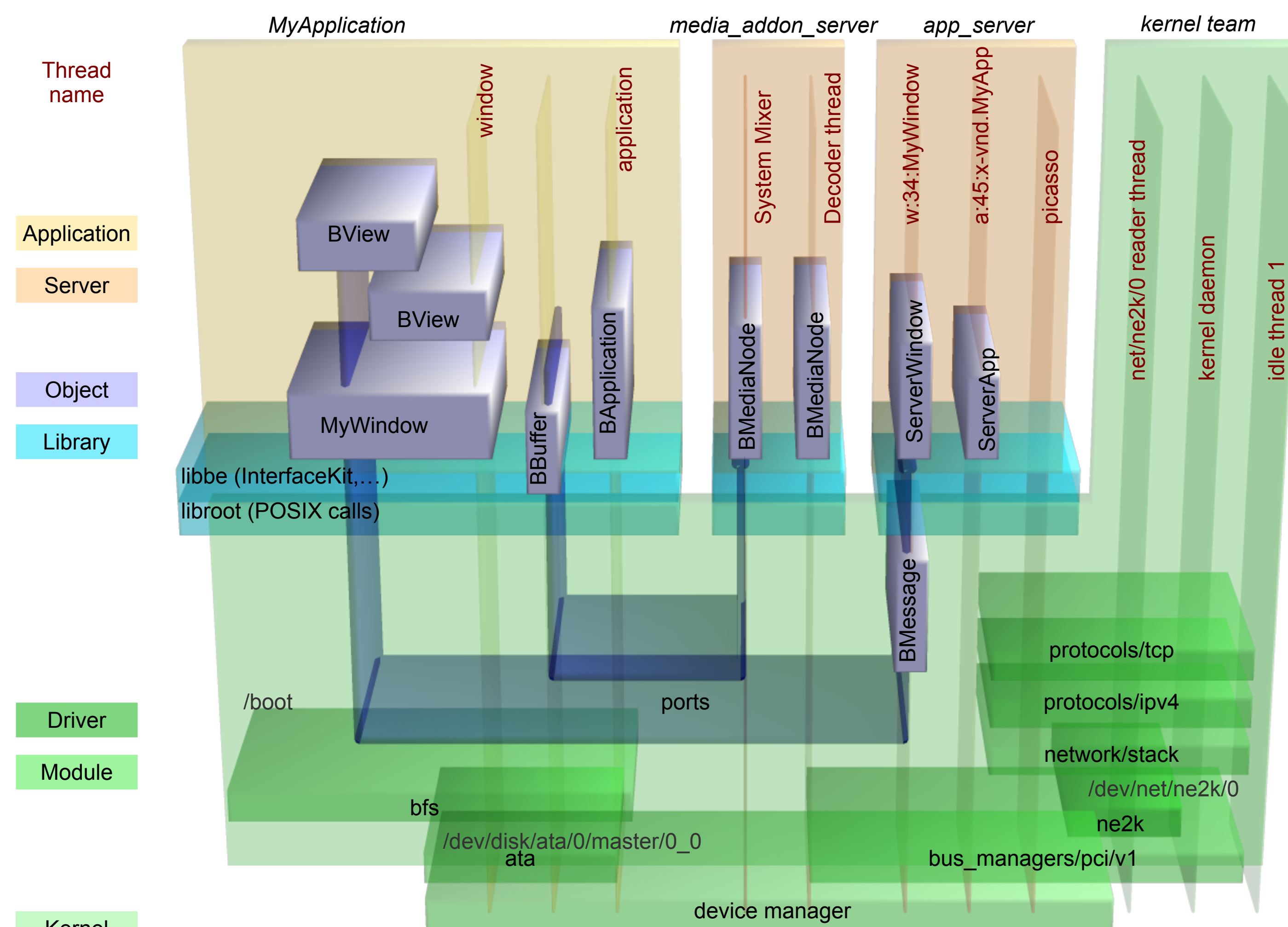
3. Object-Oriented C++ API

- Built on top of POSIX and native C calls
- Coherent hierarchy of C++ classes
- Organized in Kits
 - Support, Storage,
 - Network, Mail,
 - App, Interface,
 - Media
 - Translation (format conversion)
 - Add-ons (png, svg, SANE, gocr...)
- Demonstrates OO concepts (multiple inheritance, FBC...)



4. Clean and Coherent Design

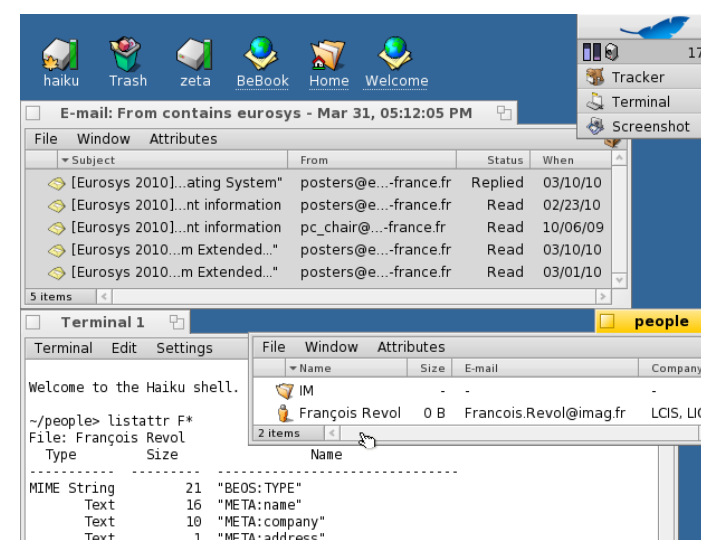
- Multithreaded Applications
 - BApplication, BWindow are BLooper
 - Smoother experience
 - Ported software can serialize
- POSIX layer in libroot.so
- C++ API (Kits) in libbe.so...
- Multithreaded Servers implement Kits (App, Media...)
- Based on Add-ons
 - Graphics “Accelerants”
 - MediaNodes
 - input_server Devices, Filters and Methods



- Multithreaded Preemptive Modular Kernel
- Innovative features
 - SMP, Tickless, Node monitoring
 - Inherited from the BeOS design (1995)
- Soft-Realtime IPCs
 - Ports pass flattened BMessage objects
- Auto-loaded Kernel add-ons
 - Modules, Drivers, File-systems
- Virtual Module Namespace
 - Maps binaries to modules
 - Binaries export many modules
- Explicit linkage = clean API

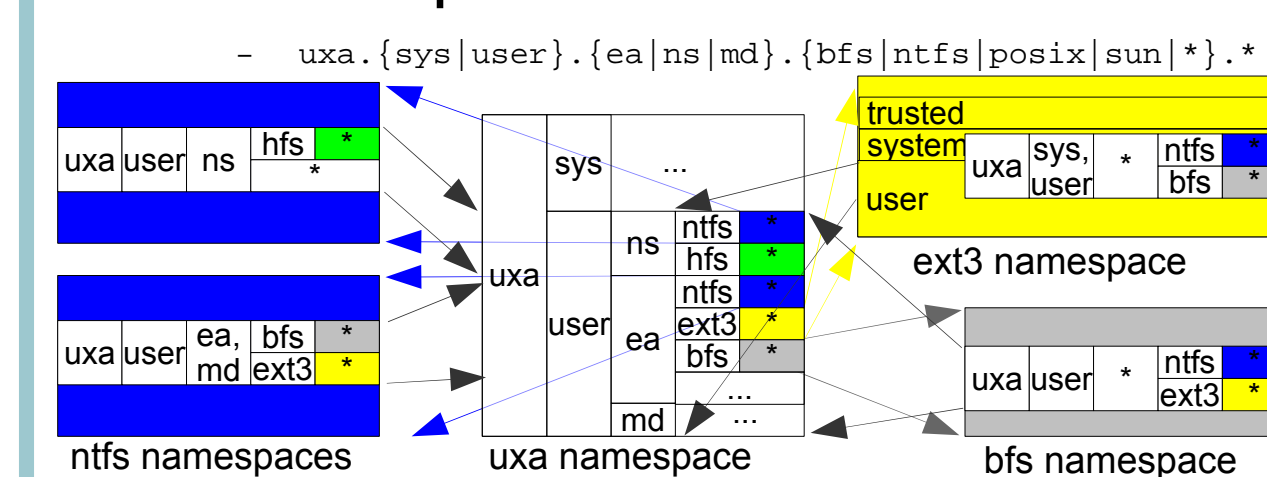
7. Filesystem

- OpenBFS
 - Classical UNIX constructs (inodes) with new techniques
 - B+Trees, block_runs (= extents)
 - Typed & Indexable Extended Attributes
 - Fast Search
 - Live Query
 - Base for Semantic Desktop
- VFS supports other types
 - ISO9660, NTFS, ext3, NFS...
 - Write and xattr overlays



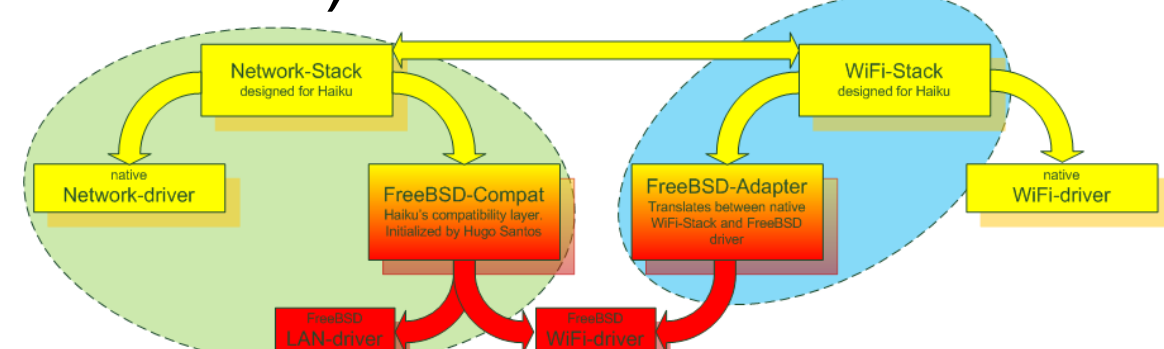
8. Extended Attributes: Need for Interoperability

- Many OSes use Extended Attributes
 - But semantics and API differ
 - Existing mapping schemes do not cooperate
- Need for Idempotent Scheme
- Proposal: A Universal Extended Attribute Namespace
 - Map global namespace in native namespace and vice-versa



5. Kernel & Drivers

- VFS & Caches
 - Axel Dörfler, *Entwicklung eines Dateisystemcaches mit Unterstützung von Methoden aus der künstlichen Intelligenz*, Master Thesis at Universität Osnabrück
- FreeBSD abstraction layer helps network drivers ports
- Wifi stack prototype
 - Colin Günther (Ongoing Master Thesis)



6. Prototyping with the GUI

- University of Auckland
 - AIMHelp: generating help for GUI applications automatically
 - Multi-Platform Document-Oriented GUIs
 - Auckland Layout Model
 - Uses Linear Programming Solver
 - C++ (Haiku), Java, .NET
 - <http://aucklandlayout.sourceforge.net/>
 - A More Manageable Multi-Window Interface
 - Stack & Tile
- Google Summer of Code
 - Sub-pixel antialiased rendering

9. Conclusion

- Clean design makes it easier to study
- Classical APIs allows code reuse
- Native API allows new designs
- Already used for research
- Haiku is a nice testbed for research and teaching

*Research and teaching needs,
Clean design and simple means,
Haiku fulfills.*

Project Links

- <http://www.haiku-os.org/>
- <http://dev.haiku-os.org/> (bugs & svn)
- <irc://irc.freenode.org/haiku>
- <http://ports.haiku-files.org/>
- <http://www.osdrawer.net/> (native applications)



Laboratoire de Conception et d'Intégration des Systèmes

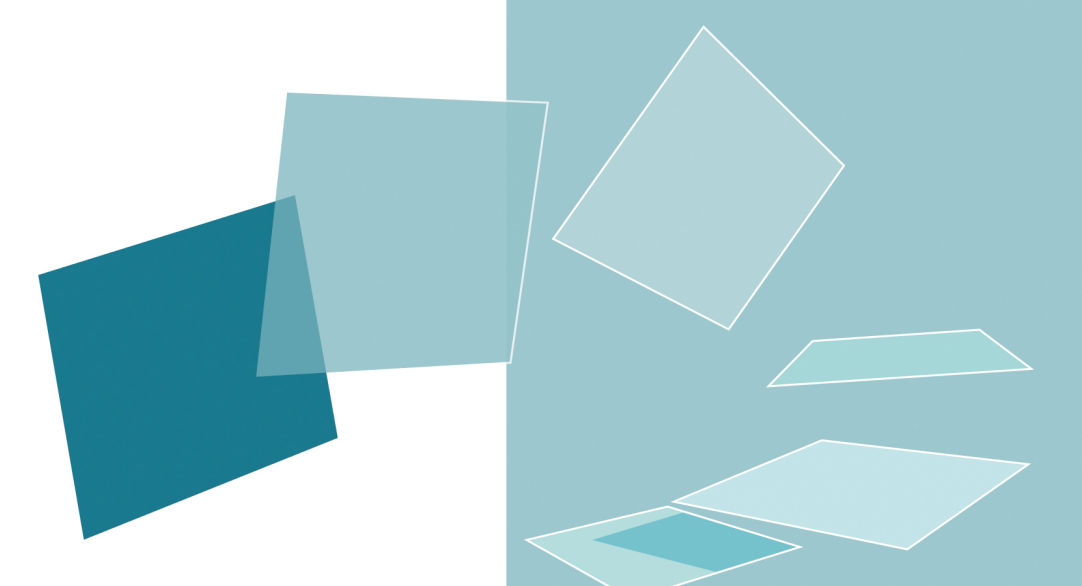
50 rue Barthélémy de Laffemas
BP54 26902 VALENCE Cedex 09
France

<http://lcis.grenoble-inp.fr/>

Laboratoire d'Informatique de Grenoble

Bâtiment IMAG C
220, rue de la Chimie
38400 Saint Martin d'Hères

<http://www.liqlab.fr/> – <http://www-adele.imag.fr/>



L I G