Welcome to the 2011 Barrelfish Workshop!

Mothy

20 Oct 2011

Systems@ETH Zürich

Many thanks…

- Tim for organizing us
- Microsoft Research for supporting us
- The Computer Lab for hosting us
- Gonville and Caius for putting up with us
- All of you for turning up!

Who's here?

- ARM Ltd.
- Barcelona Supercomputing Center
- ETH Zurich
- Google (London)
- Intel Corp (Braunschweig)
- KTH (Stockholm)
- Microsoft Research {Redmond,Cambridge}
- SICS (Stockholm)
- University of Cambridge Computer Laboratory
- University of Glasgow
- University of Manchester
- University of Strathclyde

This morning

- 09.30 Timothy Roscoe (ETH Zurich)
  Welcome, last year's progress, workshop goals
- 10.00 Werner Haas (Intel)
  System-level implications of non-volatile RAM
- 10.15 Matt Horsnell (ARM)
  OS support in ARMv7A
- 10.30 Andrew Baumann (Microsoft)
  Drawbridge on Barrelfish
  - 11.00 Coffee
- 11.30 Pravin Shinde (ETH Zurich)
  Scalable and adaptive network stack architecture
- 12.00 Jana Giceva (ETH Zurich)
  Database-OS co-design
- 12.30 Zach Anderson (ETH Zurich)
  Fine-grained, language-level, hierarchical resource management
  - 13.00 Buffet lunch

This afternoon

- 14.00 Adrian Schüpbach (ETH Zurich)
  A declarative language approach to device configuration
- 14.30 Ross McIlroy (Microsoft)
  Calico: rethinking the language / runtime-system boundary
- 15.00 Marcin Orczyk & Calum McCall (U. Glasgow)
  GHC for a multi-kernel architecture
  - 15.30 Coffee
- 16.00 Georgios Varisteas (KTH)
  Dynamic inter-core scheduling in Barrelfish
- 16.30 Robert Watson (CUCL)
  BERI: an open source platform for research into the h/w-s/ interface
- 16.45 Mikel Lujan (U. Manchester)
  Teraflux: A Manchester Perspective
- 17.00 Discussion & close

Friday 21 October

- 09.00 Coffee
- 09.30 Zeus Gómez Marmolejo (BSC)

  GCC cross compiler and Gasnet
- 10.00 Stefan Kästle (ETH Zurich)

  Message-passing co-processor
- 10.30 Tim Harris (Microsoft)

  Flexible hardware support for message passing
- 11.00 Coffee, discussion, close

Coordinate on Taxis to airport?

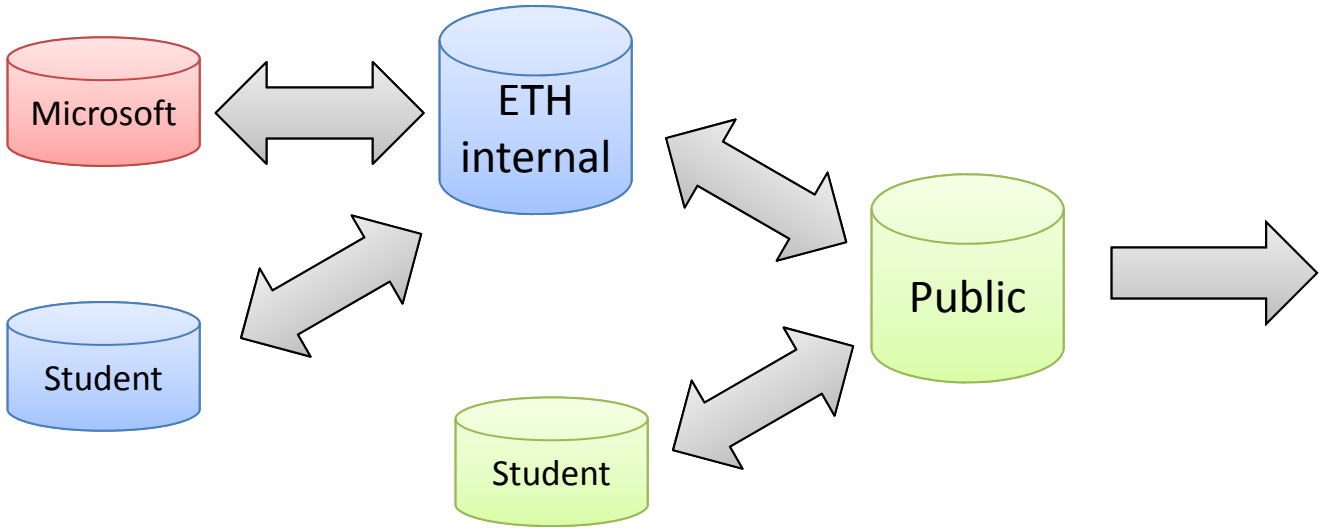
What's happened at ETHZ since Barcelona a year ago?

- New release (at last!)
- New process for releasing
- MIT Licence
- Lots of functionality
- Build system

- And plenty of work at other places…

Licences and releases

- Barrelfish is now copyright ETHZ only
- Licence is now MIT
- Release is via Mercurial



New functionality in Barrelfish

- Architectures:
  - XScale and ARM: more support, more endians
  - SCC:
    - Networking, incremental booting
    - A better memory map
    - Have booted heterogeneous SCC+x86_32+x86_64
- Networking: it's getting there…
  - Full stack (though still a placeholder)
  - e1000, rtl, tulip, SCC eMac
  - Coming: SolarFlare, e10K
- Bootscripts
  - Generally much better startup all around

Communication and Memory

- New IDC transports:
  - SCC, Ethernet, multihop, etc.
- New IDC support:
  - Waitsets
  - THC/AC language constructs
- Bulk transport
- Memory management
  - Memory reclamation! Well, mostly.
  - Distributed memory managers
  - A decent malloc

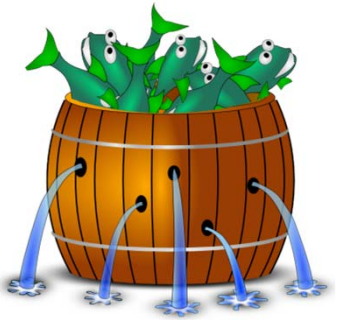
POSIX

- We will never be POSIX-compliant, but:
  - Process identifiers, kill, exit, wait, etc.
  - Semaphores, shared memory segments
  - Buffered I/O
  - Select()
  - Srandom() etc.
  - Gettimeofday(), etc
  - Oprofile-style profiling
  - Sockets: INET and UNIX

File systems

- Basic VFS functionality
  - Multiboot image
  - CPIO RAM archive
  - NFS client
- Enough to run, e.g. PostGreSQL
- Basic AHCI driver (merging soon)

What's happening now?

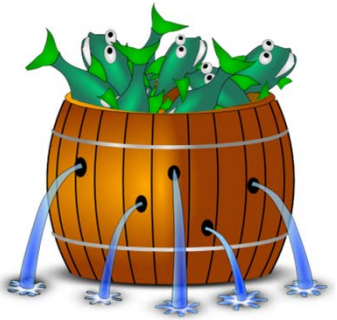


- MSR-funded grant to develop Barrelfish further
  - Kornilios
  - More release process
  - Robust testing
  - Contributed code coordination
  - General facilities

Masters work at ETHZ

- Very popular with Masters students…
  - Disk driver (AHCI)
  - Multihop routing
  - Barrelfish on two machines
  - The limits of performance isolation
  - Overhaul of the capability system
  - Overhaul of the virtual memory system
  - Combined pub/sub and lock manager
  - Misc. drivers and network stack hacking

Research topics at ETHZ

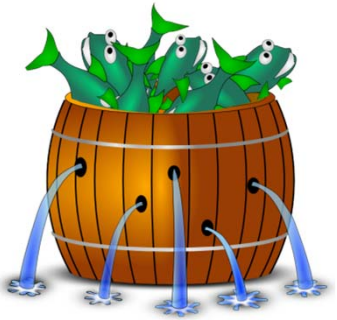


- Non-cache-coherent hardware support
- The design of the network stack
- Message-passing hardware
- Database/OS co-design
- Using the SKB to inform system policy
- Programming hardware in Prolog
- Language support for I/O, concurrency, etc.

Our goals
(and we'd like to hear yours)

- Do interesting research
  - Publish papers, graduate students, etc.
- Build a solid platform for systems research
  - Nicer to hack than Windows, Linux, etc.
  - Easier to build on for heterogeneous multicore systems
- Establish Barrelfish as a well-respected OS to use for research
  - "Community", whatever that means

What to talk about (among other things)



- What are we doing right?
- What are we doing wrong?
- How can we best accept contributions and feed code back?
- What kind of Barrelfish community do you want?
  - Support process and general comunication
  - Are these F2F meetings useful? Have more?
- Anything else that bugs you…

Feedback

- Ask plenty of questions, make plenty of comments
  - Sessions will be scribed
  - Plenty time left for discussion (we hope)
- Email comments to us (or the list, or both)
- Collar us in the hallway
  - Here
  - At SOSP
  - Other places