

# Andrew BRAMPTON

## PERSONAL DATA

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## EDUCATION

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- 2008 **Ph.D. in Computer Science, Lancaster University, UK**  
Thesis: “The Impact of Highly Interactive Workloads on Video-on-Demand Systems”  
Supervisor: Prof. Laurent Mathy  
Available at: <http://bramp.net/thesis>  
Research Interests: Content Distribution Networks, Peer-to-Peer, Autonomic Self-Organising Systems
- 2004 **B.Sc. (Hons) in Computer Science, Lancaster University, UK**  
First class honours degree  
Dissertation: “Peer-to-Peer Media Streaming”  
Supervisor: Nicholas Race
- 2001 **A-Levels, Hind-Leys Community College, Leicestershire, UK**  
in Computer Science, Mathematics, Further Mathematics, Physics and General Studies.

## WORK HISTORY

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<i>Current</i> SEPT 2007	Research Associate at LANCASTER UNIVERSITY <i>Networking Researcher</i> During the three years at Lancaster I have been involved in numerous projects, some of which involved working in small teams and others working alone. My tasks were typically research orientated (such as running and analysing experiments, and publishing my results), but in addition to this I have helped with teaching undergraduate and master's students. This included running seminars, supervising labs, marking coursework, and lecturing.
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## PROJECTS

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### Stealth Distributed Hash Table

Designed, implemented and evaluated a new type of distributed hash table (DHT), a form of peer-to-peer network, which was designed to be more reliable than existing DHTs, and suitable for high performance applications.

- Created a Java based peer-to-peer network simulator, which could accurately model underlying network properties.
- Created a C++ implementation with LUA bindings, to allow the Stealth DHT to be used in a real environment.
- Used PlanetLab (a 650 node testbed, with hosts at 300+ sites across the Internet) to experiment with the DHT and to obtain more ‘realistic’ Internet results.
- The work produced numerous conference papers [7, 8, 9, 10, 11], a journal article [5], as well as all the source code being made available.

## Interactive Video-on-Demand

To aid my research into interactive video-on-demand I required realistic workloads of users heavily seeking through a video. To this end I captured and served the 2006 FIFA World Cup (soccer), and recorded how users consumed the content.

- Created and maintained a Video-on-Demand (VoD) system using PHP and Flash video, including the development of tools and scripts to capture video, encode, and upload to the system.
- Created statistical models based on recorded user behaviour.
- Created and developed algorithms to improve prefetching and caching for interactive VoD.
- This work was published at conferences [6, 3], in a journal [4], and finally became the foundation of my Ph.D. thesis. In addition, all source code and recorded traces were released<sup>1</sup>.

## 10Gbit+ Networking on Multi-core platforms

At the beginning of my postdoctoral research, I helped on a project which aimed to identify and remove bottlenecks associated with high speed networking on multi-processor or multi-core machines.

- Instrumented the Linux network stack, and used tools such as OProfile.
- Rewrote segments of the Linux kernel to improve TCP performance when used specifically on multi-core architectures.
- This project produced one paper [2], a network benchmarking tool<sup>2</sup>, and a Ph.D. thesis for another student.

## High Performance Routing on Commodity Hardware

Over the last two years, in my free time, I've been involved in a technology start-up whose aim is to create a high performance networking platform running on low-cost commodity hardware. I have been the chief architect and developer creating a flexible system able to sustain high packet throughputs. This work is based on a custom network engine written as a FreeBSD kernel module. Over the two years I have had extensive experience developing for the FreeBSD 7 and 8 kernels, and have managed to achieve almost linear scaling of packet forwarding with the number of cores, up to a tested rate of 40Mpps (packets per second) with throughputs easily exceeding 20Gbps. This networking platform has not yet been publicly announced, and it is our hope to get funding in the near future.

## Open Source

In my free time I have contributed to numerous Open Source projects, and have even started a few myself. To name just a few I have had patches accepted by Linux, FreeBSD, PHP, Google Chrome, Google Android, Intel's Networking Drivers, HeidiSQL, and many more. In addition to this I have open sourced and made available numerous projects ranging from academic network simulation and benchmarking to an application to mount Nintendo DS roms<sup>3</sup>, to scripts for converting ordnance survey coordinates to GPS coordinates<sup>4</sup>.

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<sup>1</sup><http://bramp.net/blog/flvtool-a-command-line-flash-video-file-flv-editor> and <http://www.rcdn.org/>

<sup>2</sup><http://bramp.net/blog/threadnetperf-v1-0>

<sup>3</sup><http://bramp.net/blog/ndsfs-a-fuse-application-to-mount-nintendo-ds-roms>

<sup>4</sup><http://bramp.net/blog/os-easting-northing-to-lat-long>

## COMPUTER SKILLS

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### Programming

Advanced	C++, C, Java, PHP and L <sup>A</sup> T <sub>E</sub> X
Casual	Bash, Python, Pascal, Lua, C# and .Net, ASP, x86 ASM, and other miscellaneous languages
Notes	Experienced developer, with strong OO knowledge. Skills range from kernel hacking to application development, from web development to scripting. Has designed and implemented large scale distributed systems and robust applications that require a high availability

### Platforms

Advanced	Windows XP, Windows Vista, Windows Servers Linux (specifically Debian) and FreeBSD 4 and above
Above Average	Configuring and running Apache+PHP, MySQL, OpenLDAP, PostgreSQL, and other services

### Simulations

Advanced	Designing and implementing a network simulator
Good	Using PlanetLab (a planetary scale test bed)
Casual	Running NS-2, OMNeT++ and other simulators

### Web Technologies

Advanced	HTML, CSS, JavaScript, PHP, CGI, AJAX, and numerous frameworks such as JQuery, Kohana and Zend Framework.
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### Mathematical

Good	Matlab, Maple, R, gnuplot
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## PUBLICATIONS

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- [1] Matthew Jakeman, Andrew Brampton, and Stephen Pink. Facilitating network auto configuration in next generation internet protocols. In *FutureNet II - Second international workshop on the network of the future in conjunction with IEEE Globecom*, December 2009.
- [2] Matthew Faulkner, Andrew Brampton, and Stephen Pink. Evaluating the performance of network protocol processing on multi-core systems. In *International Conference on Advanced Information Networking and Applications (AINA)*, May 2009.
- [3] Andrew MacQuire, Andrew Brampton, Michael Fry, Nicholas Race, and Laurent Mathy. A case for hybrid content distribution for interactive video-on-demand. In *International workshop on Future Multimedia Networking (FMN)*, September 2008.
- [4] Andrew Brampton, Andrew MacQuire, Michael Fry, Idris Rai, Nicholas J. P. Race, and Laurent Mathy. Characterising and exploiting workloads of highly interactive video-on-demand. *Multimedia Systems Journal*, 2008.
- [5] Andrew MacQuire, Andrew Brampton, Idris A. Rai, Nicholas J.P. Race, and Laurent Mathy. Authentication in stealth distributed hash tables. *Journal of Systems Architecture*, 54(6):607 – 618, 2008. Selection of best papers from the 32nd EUROMICRO Conference on [‘]Software Engineering and Advanced Applications’ (SEAA 2006).
- [6] Andrew Brampton, Andrew MacQuire, Idris Rai, Nicholas J. P. Race, Laurent Mathy, and Michael Fry. Characterising user interactivity for sports video-on-demand. In *International workshop on Network and Operating Systems Support for Digital Audio & Video (NOSSDAV)*, June 2007.
- [7] Idris Rai, Andrew Brampton, Andrew MacQuire, and Laurent Mathy. Performance modelling of peer-to-peer routing. In *4th International Workshop on Peer-to-Peer Systems (HOTP2P)*, March 2007.
- [8] Andrew Brampton, Andrew MacQuire, Idris Rai, Nicholas J. P. Race Race, and Laurent Mathy. Stealth distributed hash table: A robust and flexible super-peered dht. In *2nd Conference on Future Networking Technologies (CoNEXT)*, December 2006.
- [9] Andrew MacQuire, Andrew Brampton, Idris Rai, Nicholas J. P. Race, and Laurent Mathy. Authentication in stealth distributed hash tables. In *32nd Euromicro Conference on Software Engineering and Advanced Applications*, August 2006.
- [10] Andrew MacQuire, Andrew Brampton, Idris Rai, and Laurent Mathy. Performance analysis of stealth dht with mobile nodes. In *3rd International Workshop on Mobile Peer-to-Peer Computing (MP2P)*, pages 184–189, March 2006.
- [11] Andrew Brampton, Andrew MacQuire, Idris Rai, Nicholas J. P. Race, and Laurent Mathy. Stealth distributed hash table: Unleashing the real potential of peer-to-peer. In *ACM Conference on Emerging Network Experiments and Technology (CoNEXT) (Student Workshop Session)*, October 2005.