

# A .NET Research Laboratory at Edinburgh

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## Introduction

We propose to set up an academic .NET research laboratory in the Division of Informatics at the University of Edinburgh.

The University of Edinburgh is a world-class centre for Informatics, with excellent ratings in both teaching and research (5A). With over eighty staff actively involved in research, the Division has the largest concentration of excellence in Informatics within any UK university.

We already have a number of exciting projects where .NET is a relevant technology; the aim of the .NET laboratory is to raise their profile and encourage the development of new research activities. As a measurable objective, we hope to generate within three years one or more new research grant proposals in the area.

## .NET and Informatics Research

Microsoft's .NET platform provides many opportunities for well-founded theoretical investigations, and for research into future computing systems. The subjects of this research include the .NET platform itself; the common intermediate language; the high-level languages supported and their compilation environments; the unprecedented degree of language interoperability which .NET affords; and the opportunities for mobility-aware applications.

The following projects in the Division of Informatics are examples of current high-quality research work around the .NET platform.

- An interoperable safe logic programming language for .NET (Jon Cook and Stephen Gilmore);
- Register allocation in compiling MSIL bytecode to Linux executables (Allan Clark, supervisor Ian Stark);
- Compiling Standard ML to C# (Godfrey Achola, supervisor Stephen Gilmore);
- A C# / Java cross-compiler (David Walters, supervisor Stephen Gilmore);
- Mining statistical test data using .NET and XML (Robert Hutchison, supervisor Chris Walton).

- Performance of e-commerce technologies; benchmarking .NET enterprise servers (Yussuf Abu-Shaabab and Jane Hillston);

All of these projects are active today, with researchers who would make immediate productive use of a .NET laboratory.

Other leading research programmes at Edinburgh where .NET is a relevant technology include the following.

#### **Type Systems for Resource Bounded Computation** (Aspinall, Konecny)

This ambitious EPSRC-funded project is developing tools for resource analysis in high-level languages, carrying powerful new complexity results about typed programs through optimising compilers into certified bytecode. <http://www.lfcs.ed.ac.uk/rbc>

#### **Mobile Resource Guarantees** (Aspinall, Gilmore, Hofmann, Sannella, Stark)

Edinburgh was a major player in the creation of the European Union's "Global Computing" initiative, which recently awarded substantive funding to this joint Edinburgh-Munich project, carrying forward research into advanced infrastructures for mobile code. We are now recruiting research staff for January 2002. <http://www.lfcs.ed.ac.uk/mrg>

All these groups and researchers will come together at a regular .NET seminar, to exchange ideas and experiences; this forum also aims to spark into life new research programmes in this fast-moving area.

## **Implementation**

Resources for the researchers on current projects are disparate and ad-hoc, with no shared facility for development work on the .NET framework. We aim to create such a facility, through a .NET laboratory that will further stimulate the growing interest in this platform. The laboratory will provide for academic staff, researchers and students a cluster of high-specification workstations running the Windows XP operating system with recent releases of Visual Studio.NET. It will be located within the James Clerk Maxwell Building, where most of our current .NET-related research is sited, and will initially host up to ten workstations with a supporting server.

We need funding to purchase workstations, software licenses, network components, and to support the infrastructure that the Division of Informatics offers: internet connectivity, printing and backup services. We estimate the following costs.

10 × PC's, at £1000 (inc VAT) for Dell Optiplex / Windows XP	£10000
1 × server, at £3100 (inc VAT) for Dell PowerEdge	£3100
11 × infrastructure costs, £200 per connection per year for 3 years	£6600
	<u>£19700</u>

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